

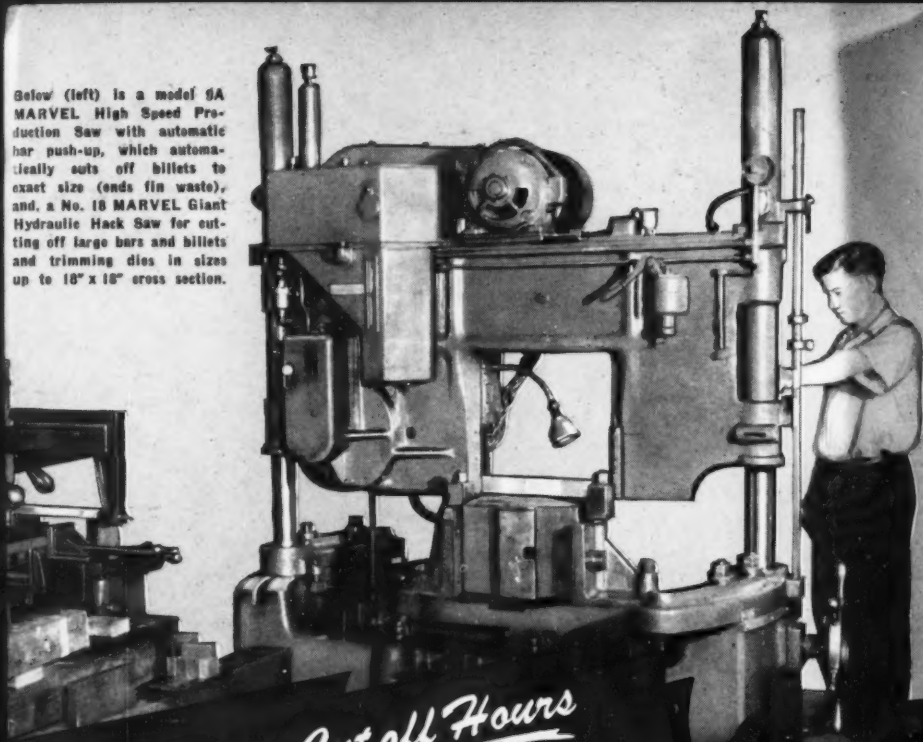
# BLUE BOOK

A DIGEST OF THE METAL WORKING INDUSTRY



A HITCHCOCK PUBLICATION

Below (left) is a model 9A MARVEL High Speed Production Saw with automatic bar push-up, which automatically cuts off billets to exact size (ends fin waste), and, a No. 18 MARVEL Giant Hydraulic Hack Saw for cutting off large bars and billets and trimming dies in sizes up to 18" x 18" cross section.

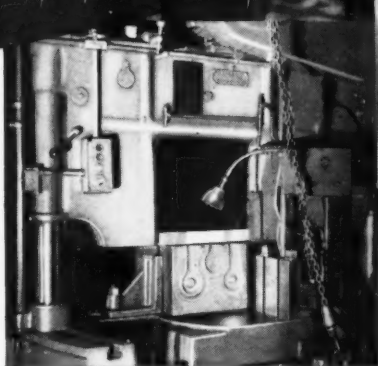


*Marvel Saws Cut off Hours  
from Die Maintenance Time*

Hubbard & Company, Pittsburgh, manufacturers of pole line hardware, picks, hammers and other drop forged specialties, use MARVEL Saws to eliminate tedious hours in making and maintaining their giant forging dies. Not only do these saws do all regular cutting off of steel for the machine shop, die blocks for die shop and exact size billets for the forge shop, they also materially cut the cost of die maintenance.

Previously, it was necessary to plane the face of dies being re-worked. This was a long and tedious job because the die face is always work-hardened with hard spots that had to be chipped or ground out before the planer tool could make a cut. Now with MARVEL Saws, the face of a die is speedily and accurately "skinned" — a thin slice is sawed off just behind the hard spots. After this speedy "skinning" and a single facing cut on the planer, the die is ready for the die sinker. This modern MARVEL method is saving Hubbard a lot of dies, materials, labor and machine time.

For quick reference see our section in Sweet's File—Mechanical Industries or write for catalogue.



**ARMSTRONG-BLUM MFG. CO.**

"The Hack Saw People"

5700 Bloomingdale Ave.

Chicago 30, U.S.A.



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Better Machines—Better Blades

*Metal Cutting*  
**SAWS**

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**CIRCLE R** Tungsten Carbide Tipped Circular Saws 2½" to 10" dia. 2½" to 4" as thin as 3-64. Special sizes available on request. With square and radius cutting edges. Tolerance plus or minus .00025.

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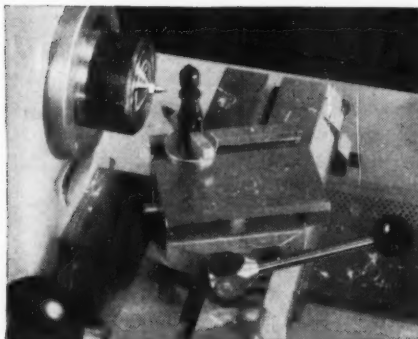
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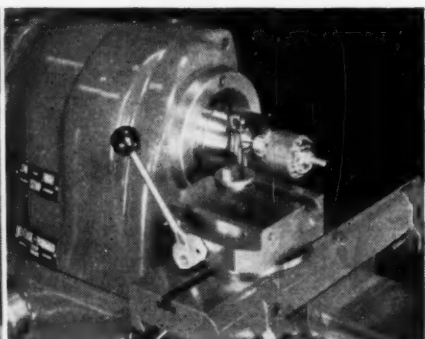
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## High Speed Production Turning of Precision Automotive Parts



### TURNING NEEDLE VALVES

Modern carburetors require needle valves made to laboratory accuracy. Valves turned on Hardinge machines set new and high standards of accuracy and, at the same time, reduce costs by a direct increase in production.



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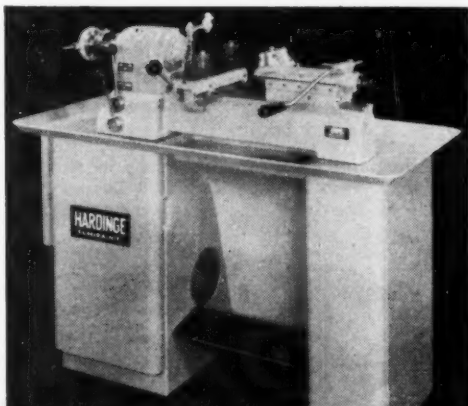
High spindle speed, rigidity and built-in accuracy make commutator turning on Hardinge equipment an easy production job. Smooth finish, concentricity and no "drag over" of copper assure a carefree production schedule.

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Save time and money through the use of Hardinge Precision Second Operation Machines in your plant.

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"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

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# ARMSTRONG

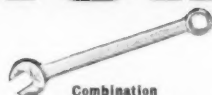


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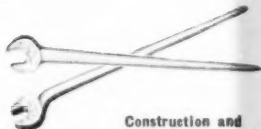
Armstrong Tools are stocked by leading tool departments.



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Hex Box



Reversible Ratchets



Detachable Sockets and Sets



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5208 W. Armstrong Ave.  
Chicago 30, Illinois

# Machine and Tool BLUE BOOK

Published Monthly

Volume 45, No. 2

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Application is pending for acceptance under act of June 5, 1934.

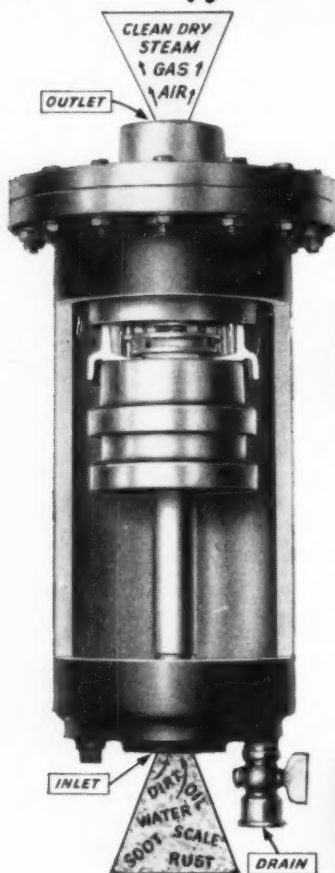


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**No MOVING PARTS**  
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The accurately rated capacities of CMD Textite Air Separators assure ample C.F.M. volume to clean air and thoroughly dry it. Not mainliners; should be installed at or near point of use. Four sizes from 25 C.F.M. to 250 C.F.M. inclusive. Write for bulletins and complete technical data.

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## You should know *MORE* about FULMER HONING MACHINES

... to get high speed accuracy on finishing all types of cylindrical bores from  $\frac{1}{2}$ " to 30" diam. Fulmer Honing Machines remove stock **faster**, more economically, with **greater** accuracy, than any other method. Rugged in construction, simple to operate, Fulmer Honing Machines give maximum production with minimum investment.

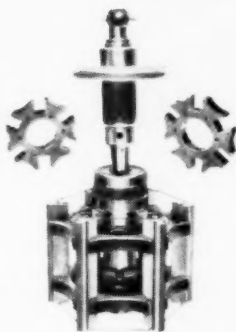
★ **WRITE FOR NEW HONING BULLETIN, fully illustrated.** Gives valuable information on honing applications, **Alexander Ball** tools, and specification details on all models of Fulmer Honing Machines.



Fulmer Model 412  
 $\frac{1}{2}$ " - 4" honing capacity

## HONING TOOLS NOW AVAILABLE!

The **Alexander Ball** line of honing tools is now distributed exclusively in the United States by C. Allen Fulmer Co. Available in sizes from  $\frac{1}{2}$ " to 50" diam. In many sizes of these tools, removable flanges are available in 1" or 3" increments of diameter. The same stone holders and basic tool are used. With **Alexander Ball** Tools the investment is very low where a wide range of diameters are honed. Write for complete details and prices.

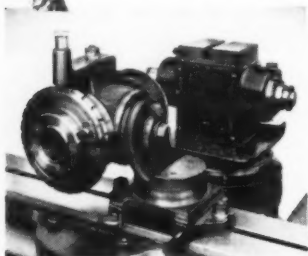


**C. ALLEN FULMER CO.** 1242 First National Bank Bldg.  
CINCINNATI 2, OHIO

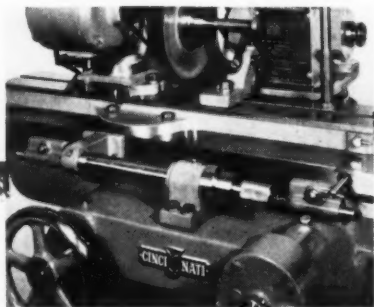
# Your Cincinnati No. 2 Cutter and Tool Grinder

## *TAKES ON MORE RESPONSIBILITY* WITH LARGER FAMILY OF ATTACHMENTS

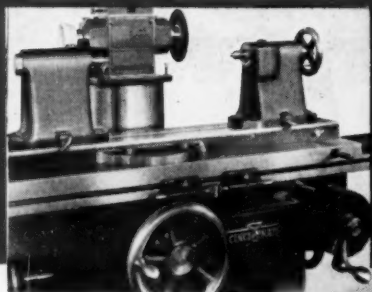
A big family makes "Pop" work steadily, and a lot of attachments have the same effect on machine tools. The attachments illustrated here are recent additions to the "standard" line for CINCINNATI No. 2 Cutter and Tool Grinders. Most shops could use some of them to advantage. And when you see how useful they are, perhaps you will find that you need another CINCINNATI Cutter Grinder in your shop to take over some of the work now being handled at a higher cost by other methods. Look into these possibilities today. Catalog M-1618 contains machine specifications.



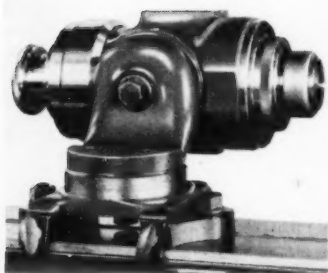
**Workhead Indexing Attachment.** Offers an optional method, preferred in some shops, of grinding straight fluted cutters and end teeth on end mills and co-bore cutters. For salvaging straight tooth cutters.



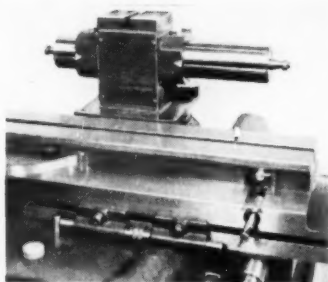
**Micrometer Table Positioning Attachment.** Has 8" adjustment, dial graduated in thousandths. Does not restrict use of machine for conventional cutter sharpening operations. For grinding accurate steps on blade drills and counterbores; for grinding grooves and "lands" on hydraulic valves.



**Heavy Duty Tailstocks.** For grinding heavy, large diameter cutters. Maximum swing, 16".



**Draw-in Collect Attachment.** For grinding small cutters of the "Weldon" type.



**Extended Grinding Wheel Spindle.** For surface grinding and sharpening broach inserts.



**Dust Exhaust System.** For isolated CINCINNATI No. 2 Cutter Grinders, and for groups requiring individual dust collecting units because of frequent changes in shop layout.

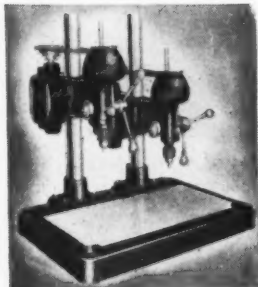
## THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES  
PLANE HARDENING MACHINES • OPTICAL PROJECTION BROACH GRINDERS • CUTTING FLUID

# In The Models You Need to GET THE WORK OUT!

## *"Buffalo"* No. 15 DRILLS



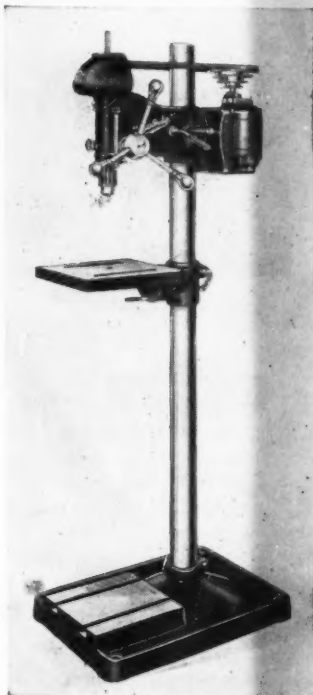
"Twin"—one can drill while other head taps in second operation. Available in three or four spindles.



No. 15-M for heavy-duty manufacturing, has adequate room for handling jigs and work pieces. Easy to operate. 1, 2, 3, or 4-spindle units.

HERE'S a line of rugged manufacturing drills for the range up to  $\frac{1}{2}$ " designed to fit INDIVIDUAL shop requirements. Controls, adjustments and speed changes are so simple that setup and operating time are cut to the bone. And you can practically pick the single or multispindle floor or bench model you need to throw your drilling or tapping into high gear!

Write for Bulletin 2963-D and see the features of No. 15 Drills that mean lower-cost holes for you!



"Buffalo" Floor Model No. 15 Drill with 5 speeds for your high and low speed requirements. Quick to adjust for setup changes.

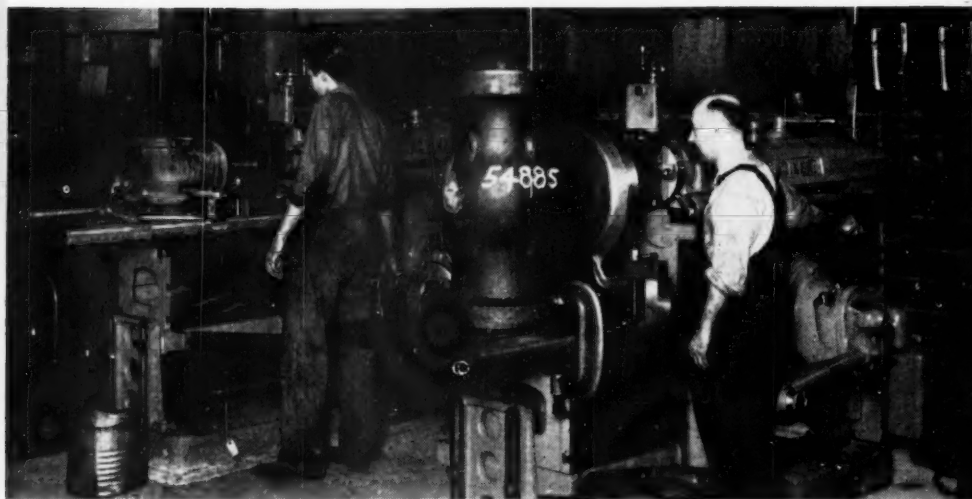
MACHINE  
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BY *"Buffalo"*

PUTTING MORE PROFIT INTO YOUR OPERATION

**BUFFALO FORGE  
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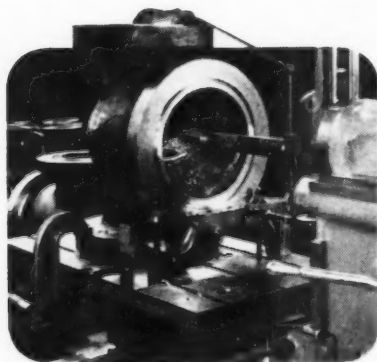
161 Mortimer St., Buffalo, N. Y.  
Canadian Blower & Forge  
Co., Ltd., Kitchener, Ont.

**DRILLING PUNCHING  
SHEARING CUTTING  
BENDING**



Photo—Courtesy William Powell Co., Cincinnati, Ohio

# Internal Shaping...



Here is a 32" Cincinnati shaping the guides on a 10" class 600-lb. flanged end gate valve body. Cut length is 16", feed, .010".

**SOLVED THE PROBLEM** Internal shaping is the answer to a long list of "hard-to-get-at jobs." The illustration shows two Cincinnati Shapers of a battery of ten machines shaping both male and female valve guides at the William Powell Company.

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**SIMPLE TOOLING** Extension tool holder and high-speed bits cost relatively little. Cincinnati supplementary tables permit rapid setups for the larger valves. Low-cost operation is combined with a high production efficiency.

Write for Shaper Catalog N-4 for complete description of Cincinnati Shapers.



## THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

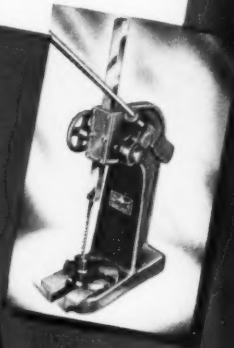
SHAPERS • SHEARS • BRAKES



## you take to **CUT KEYWAYS**

in gears, cutters, couplings, collars,  
pulley hubs or what have you

with  
this



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to set up a big machine tool for this small but  
essential job... Let the "Minute Man" save you  
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Please send me Descriptive Folder and Price List "T"

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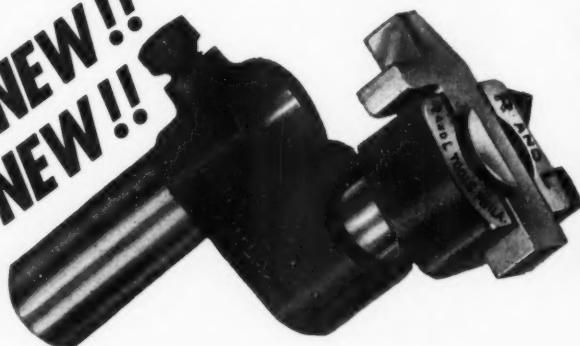
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HOLDER**

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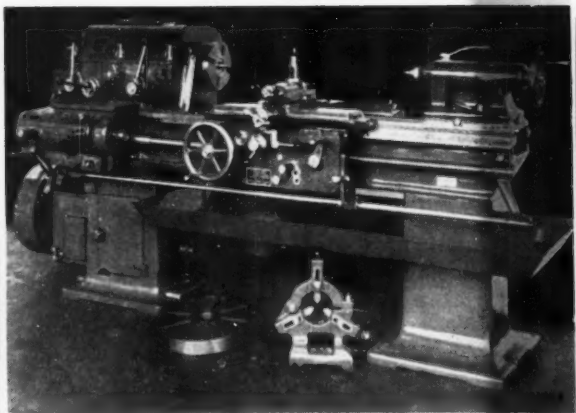
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**TURNING  
TOOL...  
Replaces  
14 TOOLS**

Can be changed from  
**RIGHT to LEFT**  
... in 10 Seconds

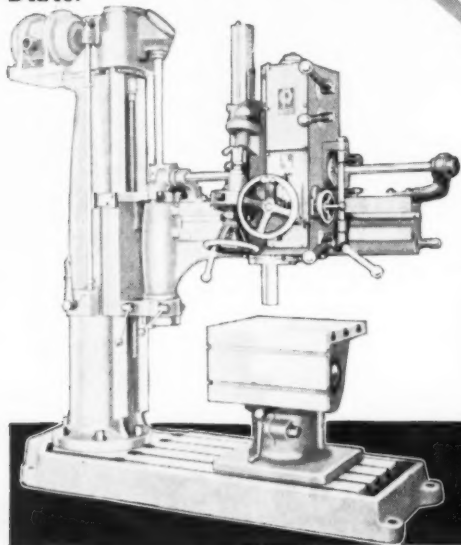
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**1825 BRISTOL ST., NICETOWN, PHILADELPHIA 40, PA.**



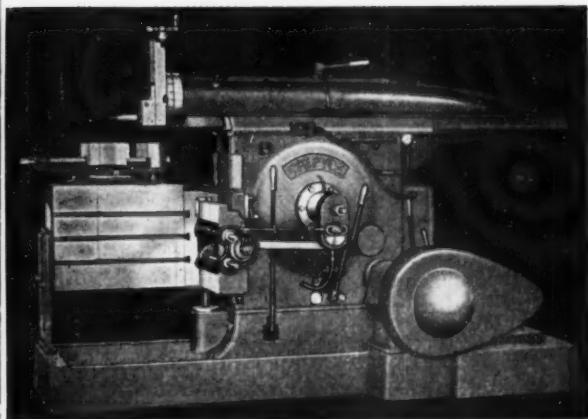
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FOR THE FINEST  
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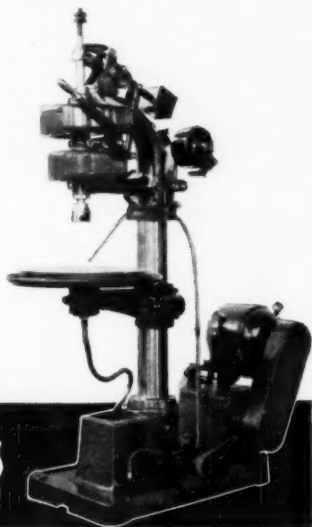
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**Machine Tool Works**

CABLE ADDRESS "WESTERN" HOLLAND



No. 530  
Carriage Clamp

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INDIVIDUALLY TESTED to assure lasting service even under the most severe conditions. Shown in arrow from top to bottom: the Spring Clamp, and the popular Hargrave Super Clamps, Nos. 44, 40 and No. 43 which is designed especially for welding. Frames are specially forged from a tough alloy steel and heat treated. Screw is hardened steel for extra toughness and to prevent battering of the thread. The No. 530 Carriage Clamp is made of a tough alloy stronger than malleable, available in popular sizes.



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*We urge buying  
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In the machining of small parts for radios, a shop was using a dark cutting oil with poor results. Finishes were rough, tool life was unsatisfactory, the dark oil made the work hard to see.

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**Machine:** Brown & Sharpe OOG Automatic

**Part:** Stud pulley for radio

**Material:** B 1112 steel

**Tools:** Rex AA high-speed circular form tools

**Spindle Speed:** 2,600 R.P.M.

**Cutting Speed:** 165 S.F.P.M.

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**SUN OIL COMPANY • Philadelphia 3, Pa.**

In Canada: Sun Oil Company, Ltd.

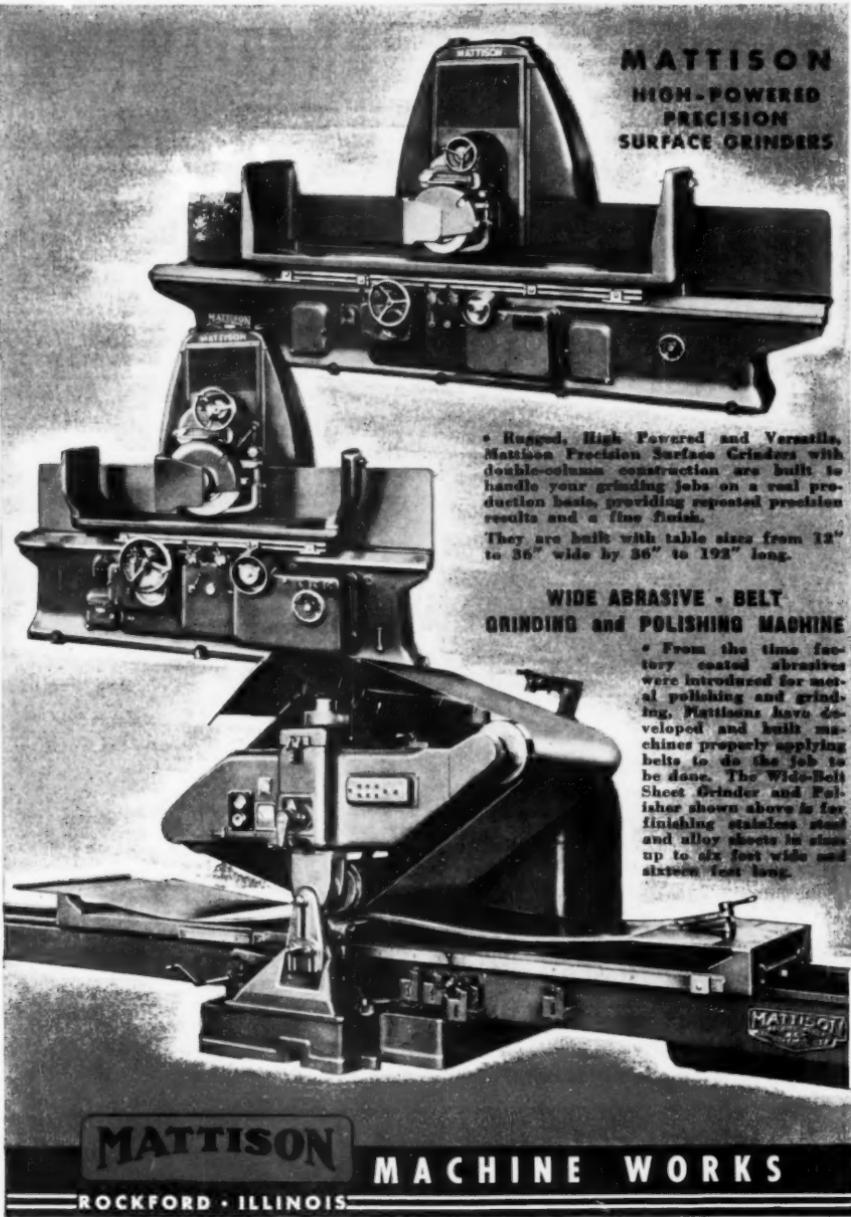
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## SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY



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PRECISION  
SURFACE GRINDERS

• Rugged, High Powered and Versatile, Mattison Precision Surface Grinders with double-column construction are built to handle your grinding jobs on a real production basis, providing repeated precision results and a fine finish.

They are built with table sizes from 12" to 36" wide by 36" to 192" long.

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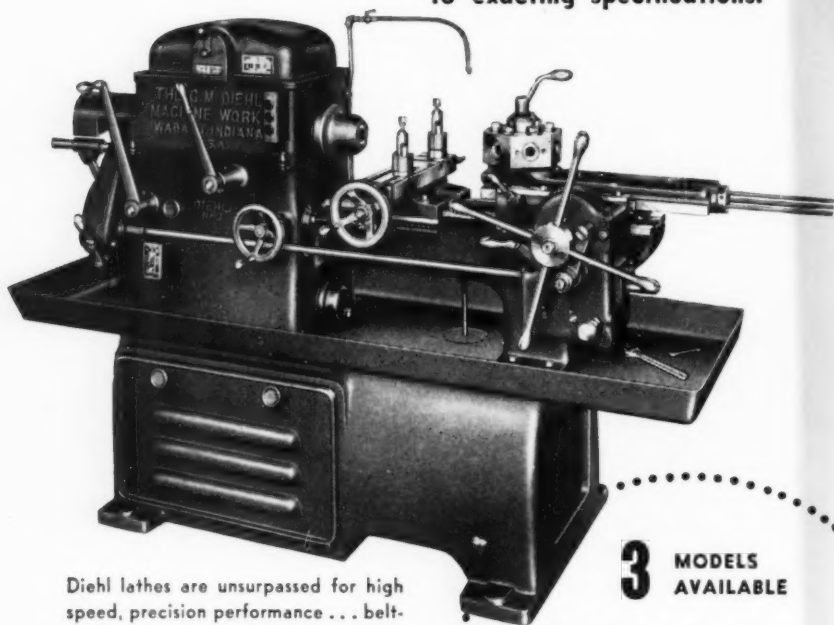
**MATTISON**

**MACHINE WORKS**

ROCKFORD • ILLINOIS

# Diehl <sup>NO</sup> 2 TURRET LATHES

assure accurate, smooth cutting  
to exacting specifications.



Diehl lathes are unsurpassed for high speed, precision performance . . . belt-driven transmission of power to assure smooth, accurate cutting to rigid specifications. Diehl No. 2 Lathes are standard size and use same tooling, including collets, as other standard No. 2 sizes. They give years of economical, vibration-free service with ample power for extreme production requirements.

## 3 MODELS AVAILABLE

- Power Feed to Turret—Screw Feed Cross Slide
- Power Feed to Turret—Lever Feed Cross Slide
- Hand Feed to Turret—Lever Feed Cross Slide

Automatic Chuck  
Capacity (round) . . . . . 1"  
Swing-over cross slide . . . . . 6"  
Swing-over bed . . . . . 14"  
Six speeds . . . . . forward and reverse

● Write for illustrated literature and specifications.

## The G. M. Diehl Machine Works, Inc.

WABASH, INDIANA, U. S. A.



**Never before...  
metal removal  
like this!**

## **How to cut costs with the NEW ROTOR 360 CYCLE TOOLS**

**T**HE new Rotor 360 Cycle Tools develop nearly twice the power of 180 cycle tools with the same size motor and develop *more power per pound* than any other type of portable tool.

The 6-inch, 360 Cycle Rotor Grinder shown weighs only 12½ lbs., operates at free speed of 6000 R.P.M. and under full load at 5700

R.P.M. This light weight and high speed under load means *greater production . . . lower costs.*

Call the Rotor Analyst for full information on this remarkable new line of Rotor grinders, sanders, buffers and polishers. Write for free copy of Bulletin 36.

**360 CYCLE O'TOOL**

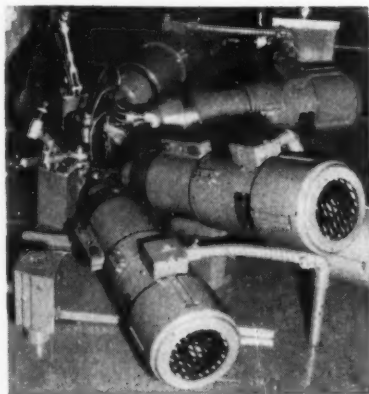
**AIR**

**THE ROTOR TOOL CO.**

CLEVELAND, OHIO

**HIGH  
CYCLE**





## Drilling and Tapping Simplified by This Combination Set-Up

**W**ITH the above set-up, consisting of two loading fixtures, one having 3 Govro-Nelson Units and the other 2 Govro-Nelson Units, drilling and tapping of the same piece has been greatly simplified, a single operator handling both operations.

Three holes are drilled at once and two holes tapped at once, the operator loading the drilling station during the tapping operation, and vice versa. The result is approximately twice the production formerly obtained when parts were drilled and tapped on separate machines.

If you have similar operations, send samples and part prints and we shall be pleased to recommend the proper Automatic Units or quote on a complete set-up. Literature sent upon request.

**WRITE FOR**  
*Literature*

### GOVRO-NELSON CO.

*Machinists of Precision Parts  
for 25 Years*

1933 Antoinette, Detroit 8, Mich.

*Automatic*

**DRILLING UNIT**

# LOOK

at this hacksawing record!

## PERFORMANCE of a single "JET-EDGE" Blade

### MONDAY

40 pieces 3 1/4" Nitroloy

### TUESDAY

50 pieces 1" x 5"  
Cold Rolled Steel

### WEDNESDAY

40 pieces 4 1/2" 50 Carbon  
Chrome Moly Steel

### THURSDAY

10 pieces 4 1/2" 50 Carbon  
Chrome Moly Steel

12 pieces 6"  
Standard Steel Pipe

30 pieces 3/4" x 5" SAE 1020

### FRIDAY

4 pieces 6 3/4" Rytense

**SEE what "Jet-Edge" can do for you.** In metal cutting, records like this mean money saved. "Jet-Edge," that rugged, unbreakable new blade with a super high speed edge welded to an extra strong back, will out-perform the best blade you've ever used. It will actually save you 20% to 50% on your power hacksawing costs, even under toughest cutting conditions.

**WRITE for a free demonstration.** Find out *why* and *how*. We'll be glad to arrange a demonstration on your own work. No obligation — except an open mind for one of the most astounding performances you have ever seen.

MILLERS FALLS COMPANY, Dept. O  
Greenfield, Massachusetts

MILLERS FALLS  
TOOLS



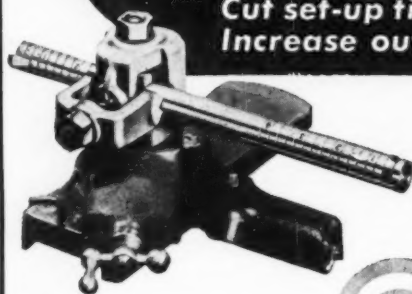
**It's new!  
It's "Jet-Edge"!  
It's Millers Falls!**

The First MAJOR Holder IMPROVEMENT In 25 Years

# GLOBE

## Boring Bar Holder Set

Cut set-up time to a minimum ★  
Increase output ★ Reduce costs



### PATENTED HOLDER

Exclusive dual clamping arrangement permits independent adjustment of bar or alignment of holder—either may be made without disturbing the other. Holder will accommodate all fractional sizes of Bars (within its minimum and maximum capacities) without use of sleeves or bushings.

### COMPLETE SETS (Holder and Three Bars)

Set No.	Diameter Bar Inches	Tool Bit Inches Square	For Lathe Swing Approx.	Price Complete
0-A	$\frac{3}{16}$ , $\frac{1}{2}$ , $\frac{3}{4}$	$\frac{3}{16}$ , $\frac{1}{2}$ , $\frac{3}{4}$	8" to 12"	\$ 16.40
1-A	$\frac{1}{2}$ , $\frac{3}{4}$ , $1\frac{1}{2}$	$\frac{3}{16}$ , $\frac{1}{2}$ , $\frac{3}{4}$	12" to 16"	26.35
2-A	$\frac{3}{8}$ , $\frac{1}{2}$ , $1\frac{1}{2}$	$\frac{3}{16}$ , $\frac{1}{2}$ , $\frac{3}{4}$	16" to 18"	35.15
3-A	$\frac{3}{8}$ , $1\frac{1}{2}$ , $1\frac{1}{2}$	$\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{2}$	20" to 22"	61.55
4-A	$\frac{1}{2}$ , $1\frac{1}{2}$ , $1\frac{1}{2}$	$\frac{3}{8}$ , $\frac{1}{2}$ , $\frac{3}{4}$	24" to 36"	87.95
6-A	$1\frac{1}{2}$ , $1\frac{1}{2}$ , $2\frac{1}{2}$	$\frac{1}{2}$ , $\frac{3}{4}$ , $\frac{3}{4}$	24" to 36"	193.50

\*  $\frac{3}{16}$ " diameter bar included in set is solid tool steel.

### INDIVIDUAL BARS (Calibrated)

Bar No.	Dia.	Length	Tool Bit	Price	Bar No.	Dia.	Length	Tool Bit	Price
162A	$\frac{3}{16}$ "	7"	$\frac{1}{8}$	\$3.50	127A	1"	14"	$\frac{1}{8}$	\$6.30
122A	$\frac{1}{2}$ "	8"	$\frac{1}{8}$	3.50	128A	$1\frac{1}{8}$ "	16"	$\frac{3}{16}$	8.75
123A	$\frac{3}{8}$ "	9"	$\frac{1}{8}$	3.50	129A	$1\frac{1}{8}$ "	18"	$\frac{3}{16}$	12.30
124A	$\frac{3}{8}$ "	10"	$\frac{1}{8}$	3.50	130A	$1\frac{1}{2}$ "	23"	$\frac{1}{2}$	16.30
125A	$\frac{3}{8}$ "	11"	$\frac{1}{4}$	4.35	176A	$1\frac{1}{2}$ "	30"	$\frac{3}{8}$	36.35
126A	$\frac{1}{2}$ "	13"	$\frac{1}{8}$	6.30	155A	$2\frac{1}{2}$ "	36"	$\frac{3}{4}$	72.70

### HIGH SPEED CUTTER BITS—PRICE EACH

$\frac{1}{8} \times \frac{1}{2}$	$\frac{1}{8} \times 2\frac{1}{2}$	$\frac{3}{16} \times \frac{1}{2}$	$\frac{3}{16} \times 1\frac{1}{4}$	$\frac{1}{4} \times 1\frac{1}{4}$	$\frac{1}{4} \times 2\frac{1}{2}$	$\frac{3}{8} \times 1\frac{1}{4}$	$\frac{3}{8} \times 2\frac{1}{2}$	$\frac{3}{8} \times 1\frac{1}{2}$	$\frac{3}{8} \times 3$	$\frac{1}{2} \times 2$	$\frac{1}{2} \times 4$	$\frac{3}{4} \times 2\frac{1}{4}$	$\frac{3}{4} \times 4\frac{1}{2}$	$\frac{3}{4} \times 2\frac{1}{2}$	$\frac{3}{4} \times 5$	
.20	.30	.20	.25	.30	.25	.35	.30	.45	.40	.75	.85	1.35	1.25	2.25	2.15	8.10

## GLOBE PRODUCTS MANUFACTURING CO.

3380 Robertson Blvd., Los Angeles 34, California, U. S. A.



## Adjustable Blade Chasers

FOR THE NAMCO STYLE DBS VERS-O-TOOLS

For Brown & Sharpe  
Automatics



New chaser, with holder offset to left; cutting edge up to proper working position.

Reground chaser, with holder offset to right to compensate for wear; cutting edge still up to proper position.

Here is an entirely new product. Nothing like it has ever been offered before, by any manufacturer.

For the first time, the proved advantages of adjustable blade chasers are available to users of Brown & Sharpe Automatics. The same Namco Style DBS Vers-O-Tool, already famous with circular chasers, will further cut your threading costs by the use of the lower-priced Namco adjustable blade chasers for medium and short-range lots.

An exclusive design feature of the adjustable blade chaser is the provision for take-up of block after each grind. Chasers are always up to proper cutting position.

With this unbeatable combination you have the latest in 1949 threading equipment—to meet the tougher price competition of 1949 markets. May we quote costs on this important modernizing step for your machines?

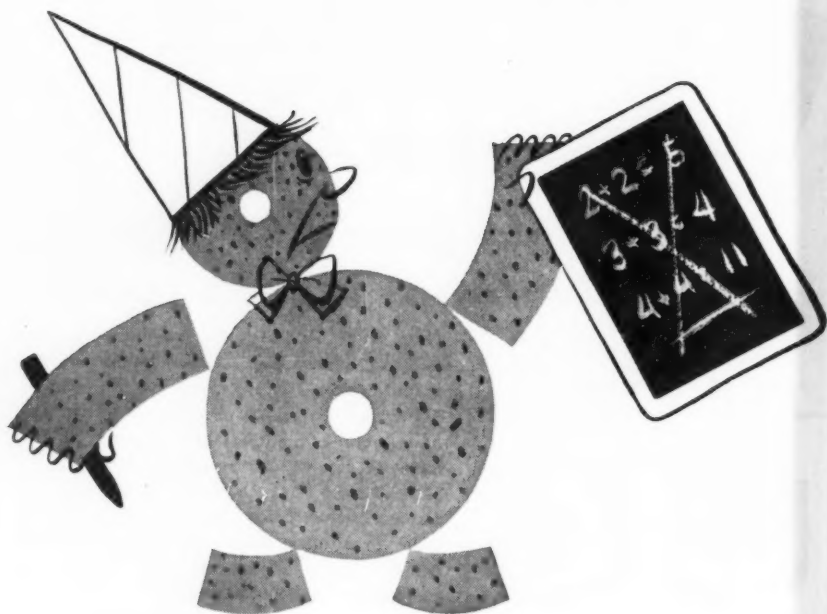
24 hour deliveries on standard NF and NC and Taper Pipe chasers, holders and slides.

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When multiplication is  
important . . . .



use

# ROBERTSON

## Grinding Wheels

**Worried about production and increased costs?** Have you examined your method of cost analysis? Are you designing products that can be ground instead of machined? Are you wasting time on your grinding operations?

Most important, don't neglect to give careful consideration to the selection of your grinding wheels. You'll find, in most cases, your best bet will be a Robertson Wheel. There's nothing superior to a Robertson for long wheel-life, fast, accurate production, and finish.

You can count on results like this from Robertson Grinding Wheels: A large manufacturing plant was grinding cotterpins made from drop forgings. Taking off 1/16" stock on a plunge cut, it was getting only 25 pieces per wheel-dressing. When a Robertson sales-engineer was called in, he studied the problem and recommended a Robertson SA 549-QV wheel. Immediately production rose to 125 pieces per wheel-dressing—an increase of 400 percent!

A sharp increase in production is not worth shouting about when it happens only once. Other users, however, are meeting with the same results, as: "Cuts grinding time in half" . . . "Production tripled" . . . "Reduces tool-grinding costs 10 percent to 20 percent." For all grinding operations—even the toughest ones—you'll get top results from Robertson vitrified-bonded or resin-bonded grinding wheels. Blueprint your problem, and let us recommend a wheel for your particular job.

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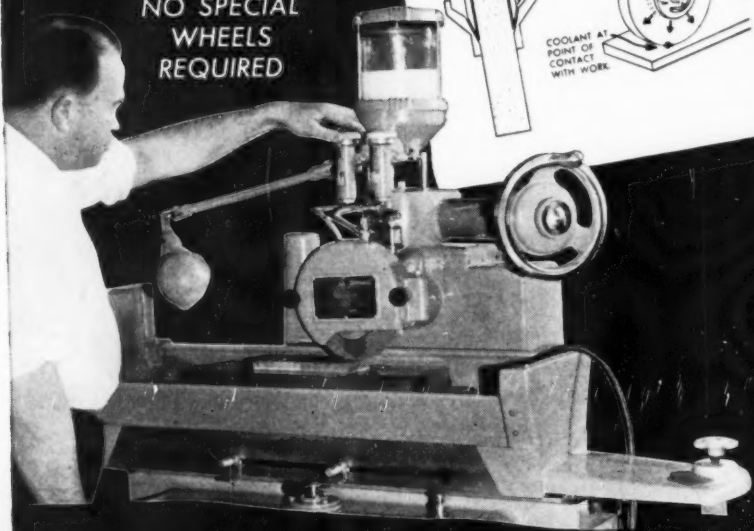
Resin-Bonded and Vitrified-Bonded Grinding Wheels • Mounted Wheels • Segments



# Do All's COOL GRINDING

Pat. No. 2,380,332

NO SPECIAL  
WHEELS  
REQUIRED



DoALL's exclusive Cool Grinding Unit on precision surface grinders produces better finish, requires fewer wheel dressings and assures longer wheel life. Keeps the work as cool as any coolant and gives better work visibility. Eliminates the need of coolant pumps and dust collectors for most work. Minimizes cracking, skin softness and warping. Secret of this new process is that coolant passes right through the wheel — fed into wheel near center and drawn to edge by centrifugal force as shown in above drawing. DoALL Precision Surface Grinders — 6 models — are hydraulically operated. Write for data.



**DoALL Co. DES PLAINES, ILL.**

what could be  
more positive...

*or simpler?*

## The MAGNA-SINE for angular work

The Magna-Sine, used with standard gauge blocks, is the only positive shop method of making fast angular set-ups. Plus this angular accuracy, the work piece is held securely, without distortion, by magnetic attraction on a permanent-magnet chuck.

The Magna-Sine—except magnetic parts—is made of hardened, seasoned steel and all gauging surfaces are ground and lapped flat and square for positive accuracy from every set-up.

Set-ups are made by inserting standard

gauge blocks between the plates of the Magna-Sine. The proper blocks are indicated for all angles in the Table of Constants furnished with every unit. No dials to go out of adjustment; no scales to mis-read . . . no parts to move or go out of adjustment after the set-up is completed.

*Write for descriptive bulletin which gives full details and prices on these versatile units. Thousands are in daily use.*



OMER E.

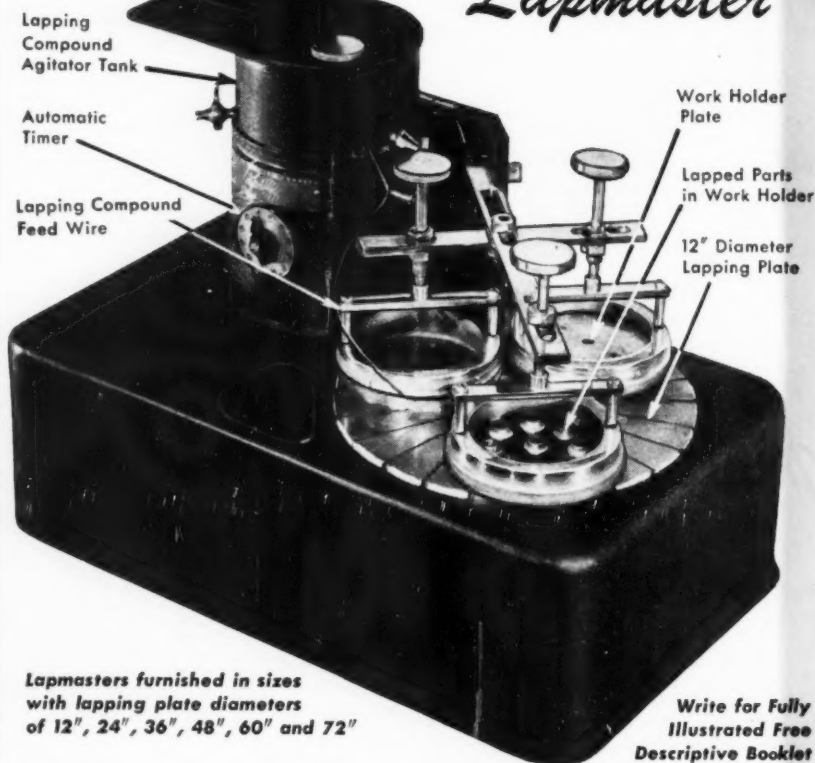
*Robbins* COMPANY

*Manufacturers of the MAGNA-SINE and Other Precision Tools*

5722 Twelfth Street

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# The New JOHN CRANE *Lapmaster*



*Lapmasters furnished in sizes  
with lapping plate diameters  
of 12", 24", 36", 48", 60" and 72"*

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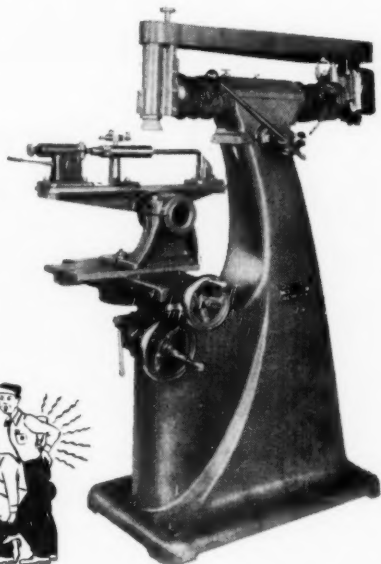
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## is Different!

There is a reason for the superlative results obtained by users of the Oliver ACE Cutter Grinder.

We at Oliver have reversed the usual grinding procedure in sharpening cutters. On the ACE the cutter is held in fixed position and the grinding wheel moves across the tooth. This method results in accurate grinding with fewer fixtures (easier to set up, too); desired angles and clearances are easily obtained by the use of universal fixtures and adjustable grinding wheel spindle. A fixed diamond for dressing the wheel assures better than ordinary accuracy on every cutter.

Use the ACE to keep face mills, reamers, end mills, side mills, spot facers and all kinds of special tools and cutters in "like new" condition.



Hundreds of installations in the country's largest plants show that the ACE method betters by far the results obtained the old way — and does the job faster.

Available in Standard (shown above) and Heavy Duty (for Carbide metals) Models.

IMPROVE YOUR TOOLROOM  
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AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
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GRINDERS—DRESSING MACHINE

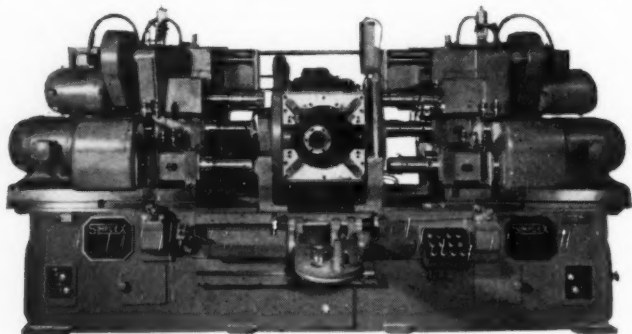
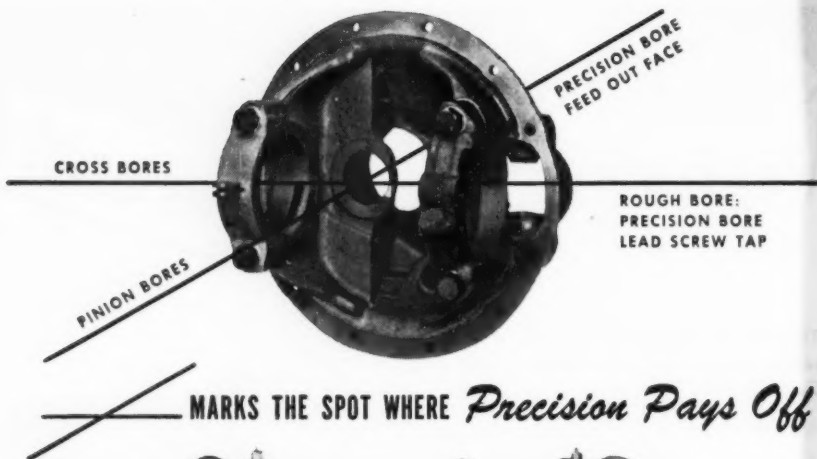
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31



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**Simplex**

## PRECISION BORING MACHINES

SIMPLEX MACHINE TOOL DIVISION

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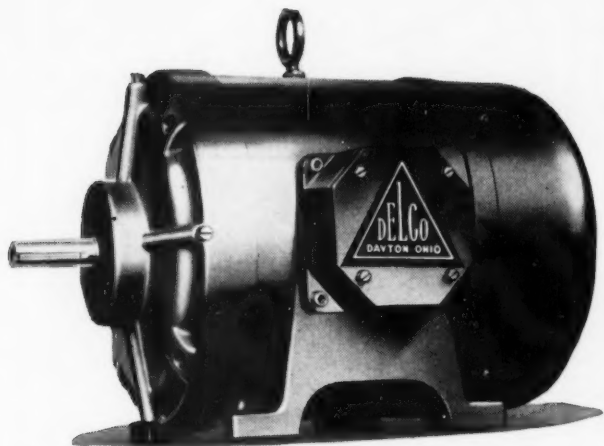
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PRECISION BORING MACHINES

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that mean you can depend on Delco for dependable power.

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Delco totally enclosed fan-cooled motors are produced in sizes ranging from fractional ratings to 75 h.p. (Continuous duty, constant speed, 60 cycle, polyphase.)

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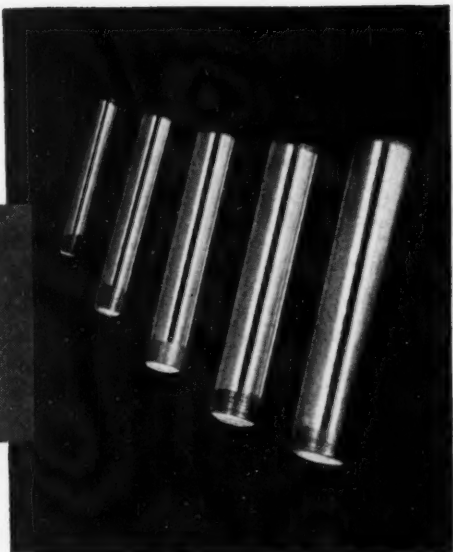
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**HARDENED AND PRECISION GROUND—  
CAN BE DRIVEN WITHOUT UPSETTING**

Wherever parts must be accurately joined or held together, you can depend upon Danly Precision Dowel Pins to save time. Because they're hardened, they can be driven in or out of holes without upsetting. They assure an accurate fit because they are precision ground to limits of 0.0001".

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## TO YOUR SKILLED HANDS

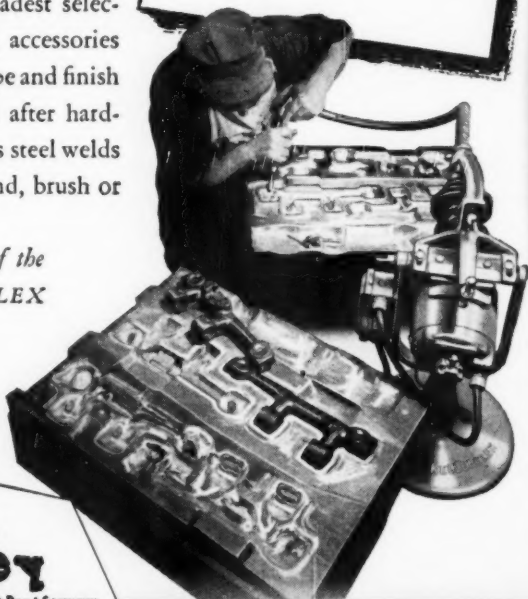
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For split-second  
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**SKIL Drills!**

Whenever the contest... whenever the job... SKIL Drills are the perfect answer to all drilling problems. They drive bits fast and clean through wood, steel or composition. They perform more holes per hour on production, installation, repair and maintenance work. And SKIL Drills save you time and money at every turn.

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Call your SKIL Tool Distributor for a demonstration. Get SKIL Drills today!

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For top production... at lowest costs... get SKIL Tools! They're packed with fast-working power... built with long-lasting stamina. Ask your Distributor to demonstrate SKIL Tools today!

### SKIL Drills



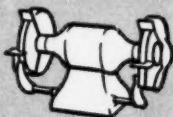
A size and type for every job from lightest production drilling to heaviest boring, reaming and hole-cutting. 33 powerful models.

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Speed all surfacing on flat surfaces of wood, steel and compositions. Belt widths from 2 1/4 to 4 1/2 inches. 4 powerful models.

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Completely new line of powerful, fast-working grinders to boost production grinding, sharpening, wire-brushing and buffing. 4 models.

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# **GORTON 2-28B**

for  
**HEAVY-DUTY  
PRODUCTION  
WORK**



**NOTICE FULLWIDTH KNEE and compare with width of  
conventional models.**

FIRST No. 2 MILL TO FEATURE Fullwidth KNEE

# ..Complete Information



Send for Bulletin 2321  
today — see the extra value  
built into this production tool

All-New 10 H.P. Fullwidth No. 2  
Horizontal PLAIN-TYPE Milling Machine

## OUTSTANDING FEATURES

**NEW** in design; in construction; in performance.

**DESIGNED AND BUILT** as a correlated unit to do heavier work better and to take full advantage of extra power provided.

**10 HORSEPOWER — PLUS:** Full ten horsepower is delivered to the spindle; separate motor drives table, saddle and knee.

**FULLWIDTH KNEE:** Top knee bearing is almost twice as wide as on conventional No. 2 mills — see illustration at left. Rigidity closely approaches that of bed-type machines.

**SQUARE LOCK BEARING SURFACES** with narrow center guides guard against knee tipping and saddle "cocking".

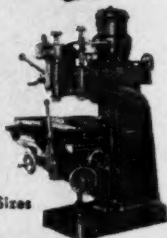
**RIGID SADDLE:** Saddle bearing spread on knee almost equals table travel. Four solid ribs reinforce saddle structure.

**PRECISION BALANCED SPINDLE** provides mass and weight of metal close to spindle nose with built-in fly-wheel action, but without superfluous parts.

**OTHER FEATURES:** Efficient, simplified gear train; full directional controls; automatic lubrication; simplified coolant system; improved electrical controls — all these provide a rugged machine built to do a bigger and better job on the production line. Write for complete information today — see bulletin illustrated above.

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*Power Controlled Milling*  
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**GORTON**



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2 and 3  
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**Pantographs for Dies — Molds — Hubs — Engraving.** Write for Gorton Pantograph bulletin which gives complete information on all sizes available.

(Swiss-Type)  
Screw Machine



Automatic Lathes — write  
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*Increase Worker  
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ite models.

**- ON THE VITAL  
SEEING ZONE**

The better a worker can see what he is doing—the faster and more accurate is his production—and the lower are your costs. Good light, under his control, is his most vital tool. That's why Localites are *first* for seeing on any precision job. With a Localite the worker controls the quantity and direction of light *exactly* as he needs it to see most efficiently his particular task. Thousands of industrial concerns are now profiting with this most efficient lighting method. Check your plant lighting, today. There is a Fostoria Localite designed for every seeing need.



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PRESSED STEEL CORP.  
FOSTORIA, OHIO**

*Fostoria Lighting Equipment Is  
Available Through Selected  
Wholesalers from Coast to Coast*



**MODEL 3267-C-172**

Used for machine tools, assembly, inspection, and instrument repair work. Overall length 32 $\frac{3}{4}$ ". Three joint adjustable. Circular base for 3-screw mounting. In excess of 200 footcandles.

**\$589 COMPLETE**

(Net Industrial Price)



**MODEL 32-H-174**

Recommended for small machine tools, lathes, punch presses, etc. Overall length 23 $\frac{1}{4}$ ". Two joint adjustable. Flat oblong base for screw mounting. In excess of 175 footcandles.

**\$431 COMPLETE**

(Net Industrial Price)



**MODEL 3470-P-172**

Used for large presses, milling and boring machines. Also assembly and inspection benches. Overall length 45 $\frac{1}{2}$ ". Three joint adjustable. Circular base for 3-screw mounting. In excess of 200 footcandles.

**\$611 COMPLETE**

(Net Industrial Price)

# GREENLEE

## RE-DESIGNED 4-SPINDLE AUTOMATIC



**HANDLES HEAVIER WORK LOAD...**

**RIGIDITY AND APPEARANCE ARE IMPROVED**

Several important structural changes have been made on the Greenlee 2-5/8" 4-spindle Automatic which increase its capacity to handle the heavier cuts demanded by ever-changing production methods. • An overarm has been added that rigidly ties the spindle carrier to the gear box, giving full support when heavy end-working tools are used. Increased lateral thrusts have been offset by tying the main tool slide to the overarm with gibbed ways. • These changes have not detracted from the accessibility of the work area. It is still wide open for set-ups and adjustments. • The Greenlee "4" embodies all the features of the popular 6-spindle machine... the convenient, built-in overarm lighting, identical tool cavities and tool holders, rapidly interchangeable cross-slide cams, quick adjustment of the main tool slide stroke, built-in coolant system, quick-change feed and speed gears, and many other advantages for maximum set-up and operating efficiency.



**GREENLEE BROS. & CO., 1832 MASON AVE., ROCKFORD, ILLINOIS**

MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

for SOCKET SETS . . .

# BETTER BUY BILLINGS

# BECAUSE



#### THE RATCHET — 1/2" Square Drive

**MECHANISM DESIGN** — Billings ratchet pawl meets the tooth of the ratchet wheel at a 90° angle — direct transmission of power (see diagram above).

**STRENGTH** — Tests have proven that the Billings safety factor will allow the ratchet to take a pull in excess of the 4800 inch pounds required by U. S. Gov. Spec. No. 41-W-10 (INT). This does not have any effect on the operating mechanism.

**PERFORMANCE** — A minimum of moving parts eliminates slipping, skidding and jamming. The user's effort is transmitted directly to the driver.

**WEIGHT** — One of the lightest on the market — only 18 oz., perfectly balanced for working efficiency.

**MAN SIZED** — Billings Ratchet handle fits the hand of the average user. The shifter, which reverses ratchet direction, is thumb sized — no broken finger nails.

#### THE SOCKETS



Billings Vitalloy® Steel  
Heat Treated  
Not Broached  
Really Clean Sockets  
Individually Inspected

#### THE SOCKET SETS



There's a Billings Set for every industrial use. The component parts of Billings 3/8", 1/2" and 3/4" drive sets are specifically selected to give maximum efficiency with a minimum of pieces. Attractively packaged in sturdy, metal boxes with carrying handle and snap fasteners . . . See your Billings Distributor or write for catalog.

# BETTER BUY BILLINGS

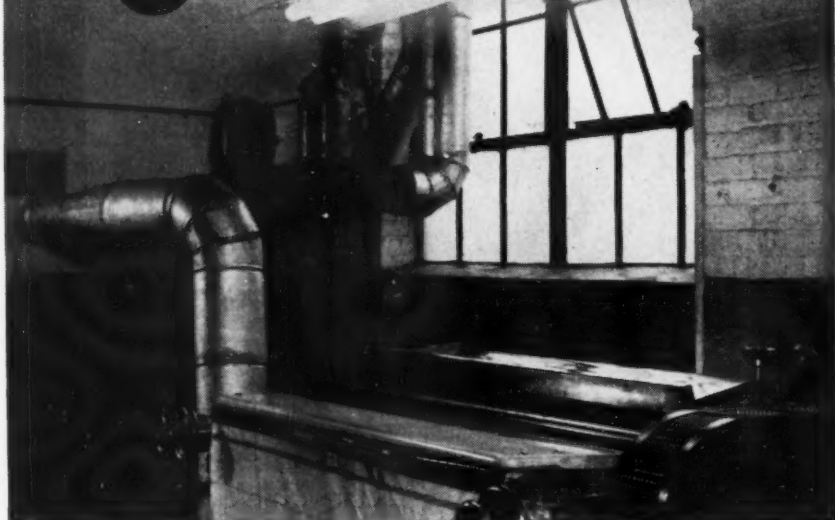


## WRENCHES & SHOP TOOLS

FROM BILLINGS INDUSTRIAL SUPPLY DISTRIBUTORS

THE BILLINGS & SPENCER COMPANY, HARTFORD 1, CONNECTICUT, U.S.A.

# TORIT DUST COLLECTORS

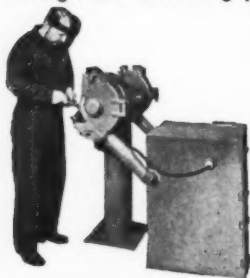


## team up to "skin" the dust problem in this leather working plant

In modern leather working plants skins are shaved and buffed to uniform thickness. It's a dirty, dusty job that liberates large quantities of abraded leather particles. To solve this problem, and eliminate the complicated piping of a central system, one manufacturer called on Torit. The results are pictured above.

In this installation two Torit No. 19-FM Dust Separators are connected, through one collecting pipe, directly to the machine. They run only when the machine is operating and collect the dust so efficiently that a subsequent cleaning operation has been eliminated.

In industry after industry Torit Dust Collectors are solving the dust problem. If you have dust conditions in your plant, get full information and the latest Torit catalog by writing:



**TORIT MANUFACTURING CO.**

303 Walnut Street

St. Paul 2, Minn.

## FOR GRINDING, POLISHING AND FINISHING

—The Backstand-Belt Method  
has these five advantages...

For grinding, polishing and finishing hundreds of consumer and industrial items, the backstand-belt method is more efficient and economical than the older set-up wheel method—because the backstand-belt has these five advantages over the set-up wheel...



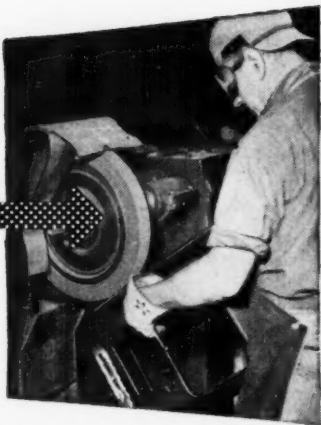
a



b

1. An abrasive belt is a scientifically made tool, manufactured under controlled conditions by experts using modern making equipment. The photomicrographs compare the crude, uncontrollable rolled-on cutting surface of (a) a typical set-up wheel with (b) the coating on an Armour Abrasive Belt. The sharp cutting points on the factory coated belt are exposed to provide faster, cleaner cutting action, increased production.
2. Coated abrasive belts cut cooler because of a longer interval between work contacts.
3. Inexperienced help can be quickly trained to operate a backstand-belt machine. Highly skilled personnel needed to dress the wheels can be used elsewhere.
4. It takes only a few seconds to change a coated abrasive belt.
5. Temperature-controlled room for curing set-up wheels can be released for other uses.

Actually, there are more than five advantages to the backstand-belt method. For additional information send coupon at left for our new informative booklet—"Facts about Backstand-Belt Grinding and Polishing."



The McCaskey Register Co., manufacturer of cash registers and bookkeeping equipment, improved polishing and deburring time on stamped out register covers 40% by switching to the backstand-belt. Whether you are polishing flat or contoured surfaces, cast, stamped or forged pieces, try backstand-belts.

We recommend buying through your  
Armour Industrial Distributor.

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*Coated Abrasives*

ARMOUR AND COMPANY

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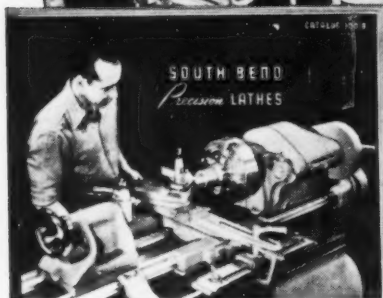
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Send Coupon at once for the catalog(s) you want—or contact our local distributor. You will find his name under "Machinery" or "Machine Tools" in your classified telephone directory.

## SOUTH BEND LATHE WORKS

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Please send the catalog(s) checked:

- ☐ Catalog 100-G    ☐ Catalog 9-F  
☐ Catalog 73    ☐ Catalog 77-U  
☐ Catalog 400

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## NEW SOUTH BEND LATHE CATALOGS

**CATALOG 100-G** describes Quick Change Gear and Toolroom Lathes with 9", 10", 13", 14½", 16" and 16/24" swings; Precision Turret Lathes with ½" and 1" collet capacities—9", 10" and 16" swings; Attachments, Accessories and Tools.

**CATALOG 9-F** describes Quick Change Gear, Plain Change Gear and Toolroom Lathes with 9" swing; Precision Turret Lathes with ½" collet capacity—9" swing; Attachments, Accessories, Tools for 9" lathes.

**CATALOG 73** describes the new 13" and 14½" Quick Change Gear and Toolroom Lathes with 1" collet capacity; also Attachments, Accessories and Tools that can be used with them.

**CATALOG 77-U** describes Attachments, Accessories and Tools available for all sizes and types of South Bend Lathes. Many of them are readily adaptable for use with other makes of lathes.

**CATALOG 400** describes the new 14" Drill Presses that are made in bench and floor models for all types of precision drilling applications.

**WRITE FOR ONE TODAY!**



**I**t seems to be a foregone conclusion in many plants that taps in the screw machine sizes are *expected* to break ... and *expected* to wear out ... quickly.

Well, there's a big difference in taps and also in the meaning of "quickly."

Here at Hanson-Whitney we know that taps are expendable to a degree ... but the degree depends upon many factors such as tap selection, type of operation, work material and lubrication.

If you are having troubles with tap breakage and tap wear we suggest that you do two things, 1) Write for our engineering suggestions. 2) Specify Hanson-Whitney taps ... finished after hardening. There are no finer taps made.

**HANSON-WHITNEY MACHINE CO. HARTFORD 2, CONN.**

**Division of Whitney-Hanson Industries, Inc.**

**Hanson  
Whitney**

For practical recommendations submit your problems to Hanson-Whitney engineers

**PIONEERS OF FINISHED TAPS**

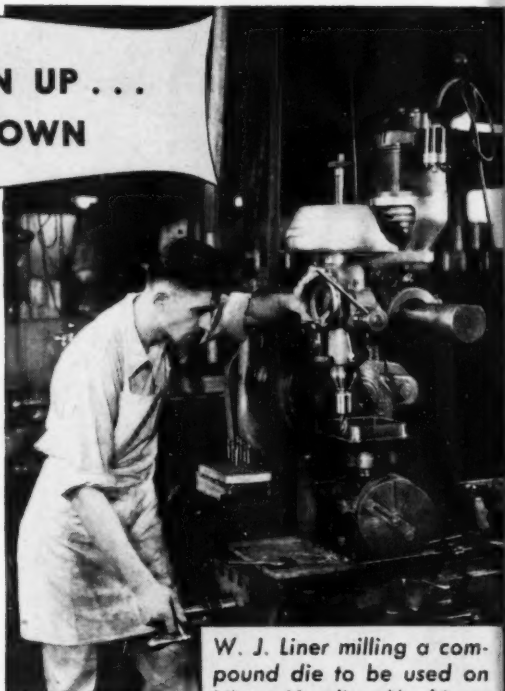
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47

**PRODUCTION UP . . .  
COSTS DOWN**

**WITH  
RUSNOK  
MILLING  
ATTACHMENT**



*W. J. Liner milling a compound die to be used on Victor Vending Machine.*

The Liner Machine and Tool Works, who fabricate parts to be used on Victor Vending Machines, is just one of the many machine shops using the Rusnok Milling Attachment on jobs that normally would call for expensive special equipment. The use of the Rusnok Attachment changes a single operation mill into a versatile machine that affects a 3 in 1 saving in time, space and money. On this particular Liner plant operation alone, production was increased 60 percent using less man hours.

Rusnok Attachment quickly converts your horizontal mill to do vertical or angular milling, drilling and boring operations. For further information on how the Rusnok Mill Head will fit into your operation write for the name of the nearest dealer.

**HEAVY DUTY**

**RUSNOK**

**ATTACHMENT**

**MILLING • DRILLING • BORING**

RUSNOK TOOL WORKS • 4840 W. NORTH AVENUE • CHICAGO 39, ILL.

When the premium's on  
gripping power...



Jacobs Ball Bearing Super Chucks hold tools with the tightest practical grip ever devised. You will find their tremendous gripping power is in a class by itself. So friction-free you can tighten them by hand alone and equal

the grip of any other key-operated chuck. Ball Bearing Super Chucks are stocked by your Industrial Supply Distributor. The Jacobs Manufacturing Company, Hartford 2, Connecticut.

**If it's a JACOBS, it holds**



**Jacobs Chucks**



CONTINUOUS ACCURACY

RUGGED CONSTRUCTION

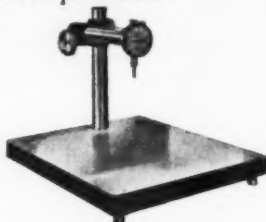
## INGENUITY PLUS--

... the combination of Ames Dial Comparators shown below will allow you to handle practically all of your measuring and control problems.



**No. 1 Dial Comparator.**

This model has a table which is adjustable for height. Lever at left of dial is pushed down to lift indicator rack spindle. Any Ames Indicator can be attached, but the one regularly supplied is Model 202 with dial numbered 0-100, reading .001", having .250" range.



**No. 130 Dial Comparator.**

Especially designed for checking comparatively heavy parts. Size of base and length of upright post to suit customer's requirements.



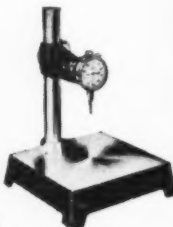
**No. 26P Dial Comparator.**

For indicating the most minute variations in size of duplicate parts. Supersensitive Fan Head Dial Indicator graduated in .00005". Total range .002". Adjustable tolerance hands and diamond contact.



**No. 2 Dial Comparator.** Compact.

Regular or dead weight contact pressure. Table dia., 2". Adjustable for "0" setting. Height 5 3/8"; weight 2 3/4 lbs.



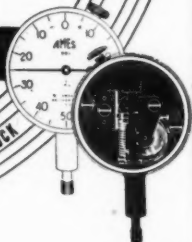
**No. 13 Dial Comparator.** The 8" x 8" cast iron base can be fitted with locating fixtures and V-blocks. The bracket supports any Ames Indicator, but regular equipment is Model 202 with dial numbered 0-100, reading .001", having .250" range.

*Address inquiries to Home Office, 28 Ames Street*

**B. C. AMES CO. Waltham 54, Mass.**

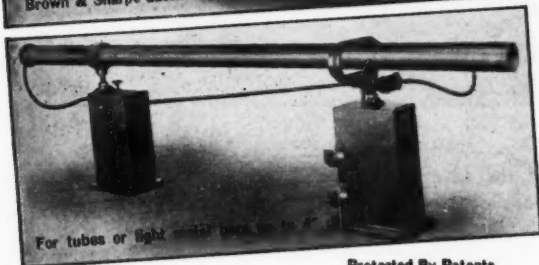
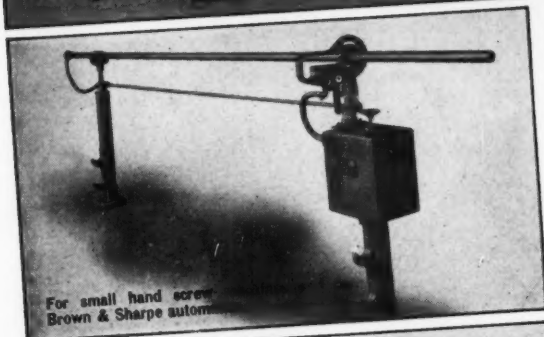
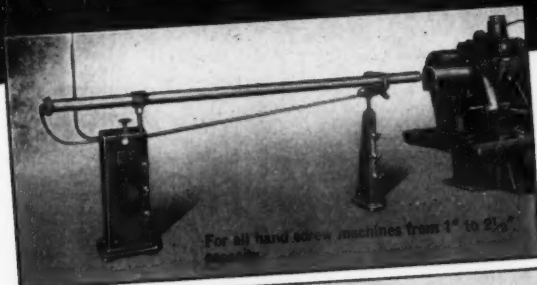
MANUFACTURER OF MICROMETER DIAL GAUGES  
AND MICROMETER DIAL INDICATORS  
*Representatives in  
principal cities*

FORGED BRASS CASE AND STEM • HARDENED STEEL GUIDE PIN AND BLOCK



# FEEDS AUTOMATICALLY

to the last possible remnant !



Protected By Patents

Special heavy-duty machine for bar stock and tubing up to and including 8" dia., in standard lengths.

## WRITE US TODAY

for complete descriptions and engineering data on Lipe Bar Feeds. No charge.

# LIPE

## PNEUMATIC BAR FEEDS

Actually, the Lipe Pneumatic Bar Feed does every part of the feed job except to replace the bar. And does it easily, automatically, rapidly and safely.

### Gets More Out of Your Machine

- Operates on any machine tool where stock is fed through a spindle or having a fixed stock stop.
- Feeds stock bar automatically into spindle.
- Reloads easily.
- Permits use of exact size polished stock to save additional operations.
- Saves on rejects due to scratching, marring.
- Eliminates end whip.
- Bar feeds for standard bar stock up to and including 2½" dia.; and lightweight bars and tubing up to and including 4" dia.
- Safe and fool-proof. Eliminates feed fingers, feed finger tube, and all other parts related to feeding in the screw machine.

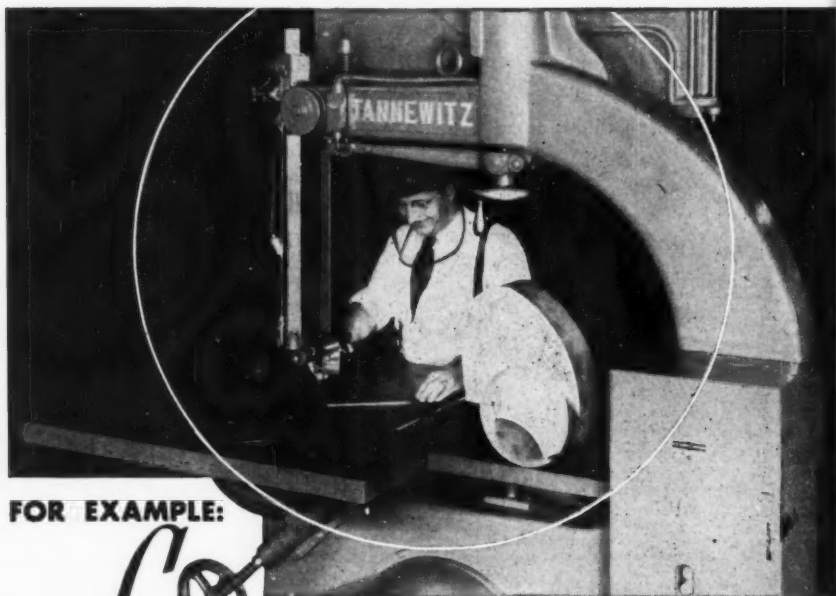


**Lipe-ROLLWAY CORPORATION, Syracuse 1, N. Y., U.S.A.**

Cable Address: LIPEGear

# FRICTION SAWING

*solves thousands of Problems!*



**FOR EXAMPLE:**

**C**UTTING side panels of a barometric damper as shown above. Cost of dies required for seven sizes would have approximated \$12,000 — a prohibitive sum for volume required on these sizes. Friction-sawn on a TANNEWITZ High Speed Band Saw in multiples of two in 1.2 minutes each — a very moderate cost which makes feasible the complete line required. Cost of machine was only a small fraction of cost of dies contemplated and it is also available for many other uses.

For trimming castings, formed parts, cutting metal as hard as a file and dozens of other operations, too, friction sawing with TANNEWITZ High Speed Band Saws offers tremendous advantage. Write for free booklet, "FRICTION SAWING."

**THE TANNEWITZ WORKS**

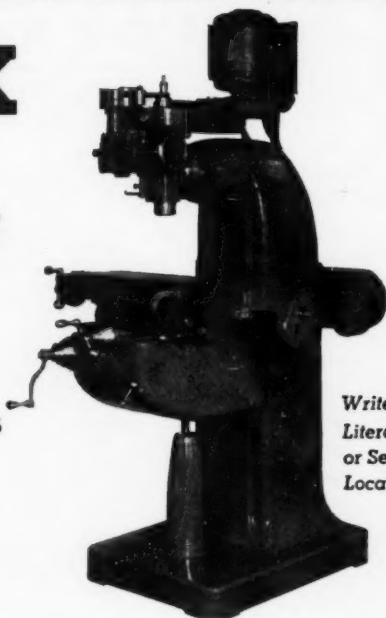
GRAND RAPIDS 4,  
MICHIGAN

*For Tool Room and Production Line*

# **INDEX**

## **MEANS SAVINGS**

- **AUTOMATIC SPINDLE  
AND TABLE FEED**
- **TWELVE CUTTER SPEEDS**
- **RAPID TRAVERSE**
- **COMPLETE LINE  
OF ACCESSORIES**



*Write for  
Literature  
or See Your  
Local Dealer*

*The Model 50 Index Milling Machine has a greater scope of usefulness than any machine of comparable size or cost, and offers substantial savings in production time and labor. It is tops for general tool room work, including locating and jig work. In addition, the machine's rigidity and freedom from chatter even under severe hogging cuts, plus the ease with which any necessary rate of feed can be obtained, and the rapid traverse for re-positioning, puts this machine definitely on the production line.*

The complete line of accessories available, including end measuring rods, right angle milling head, and both hand and power operated precision rotary tables, further increases the usefulness of this machine.

NOTE: The reliable and time proven Model 40-H Index Mill still is and will continue to be available.

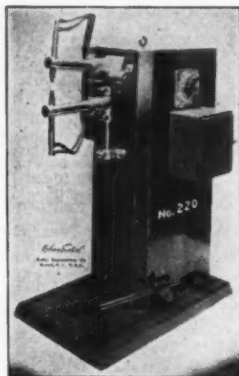
# **INDEX MACHINE CO.**

545 N. MECHANIC STREET

JACKSON, MICHIGAN

# SPOT BUTT GUN ARC WELDERS

WE MANUFACTURE A COMPLETE LINE OF  
**RESISTANCE SPOT WELDERS**  
FOR ALL TYPES OF WELDING IN SIZES: 1/4 to 300 KVA.  
WELDING TIPS, HOLDERS AND HORNS.  
ASK FOR EISLER'S TIP AND WELDER CATALOG

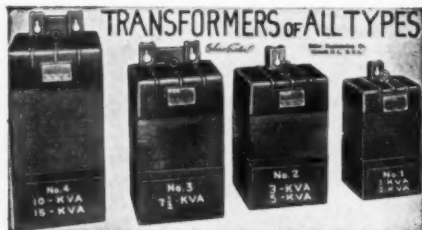


WE INVITE CONTRACT SPOT OR  
BUTT WELDING IN  
SMALL OR LARGE QUANTITIES

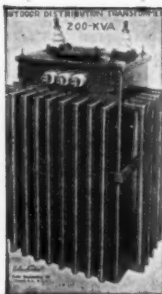


WE MAKE ALL TYPES OF **TRANSFORMERS**  
SIZES FROM 1/4 TO 300 KVA

Furnace, Distribution, Lighting,  
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Water Cooled, Reactors and Special Trans-  
formers of all types.



Oil Cooled Type



*Arc Welders*  
100 TO 400 AMPS.



*Butt Welders*



*Spot Welders*



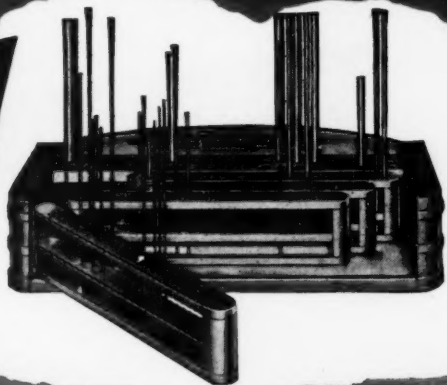
*Spot Welders*

FOOT, AIR  
OR MOTOR OPERATED

**CHAS. EISLER**  
**EISLER ENGINEERING COMPANY, INC.**  
762 South 13th Street (near Avon Avenue)  
NEWARK 3, NEW JERSEY, U. S. A.

## NEW! ACRO DRILL ROD RACK

Here is a tool room unit you need to cut costs. Pays for itself several times over in time and labor savings alone.



### COMPACT! BIG CAPACITY!

Holds 495 three-foot lengths in 133 number, letter, and fractional sizes including 1". Takes up shelf area only 27" wide x 12½" deep.

- Each rod fits its individually sized hole.
- Holes plainly marked in sizes with their decimal equivalents.
- Instant rod selection.
- Stock check-up at a glance.

**Immediate Delivery!**

**Write for complete details.**



### ACRO DIE SET PULLERS

Users everywhere praise this money-saving tool. Indispensable for the grinding, mounting, and fitting of punches. Raises punch holders straight up with no pounding, no prying, no damage to set.

### SAVES UP TO 50% OF DIE-MAKING TIME!

Notice there is no struggle to separate the die set. Indexed Screw Wrenches\* lift holder axially from die shoe. Operator raises or lowers die smoothly, safely, accurately . . . or holds it at any desired height.

Ask for folder of details.

\*Patented . . . Exclusively Acro

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METAL STAMPING  
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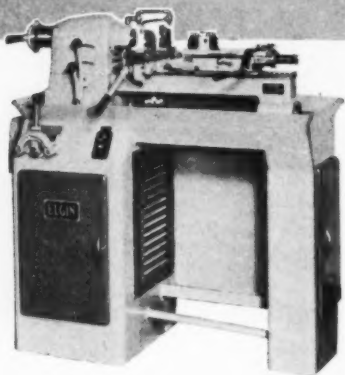
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# ON SMALL DIAMETER PRECISION PARTS

# Elgin

WILL MACHINE THEM . . . .

## Faster: More Accurately



### Elgin Knee Hole Type Hand Screw Machine

Variable speed range, 120 to 3800 rpm. 9" swing. 1" collet capacity. Collet rack inside of motor compartment door. Independent coolant system (5 gal.) mounted in rear, outside—cleaner, more accessible.

### Elgin Vertical Bench Drilling Machine

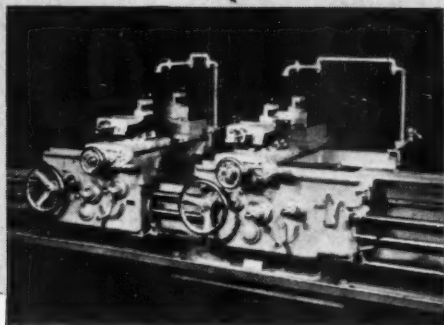
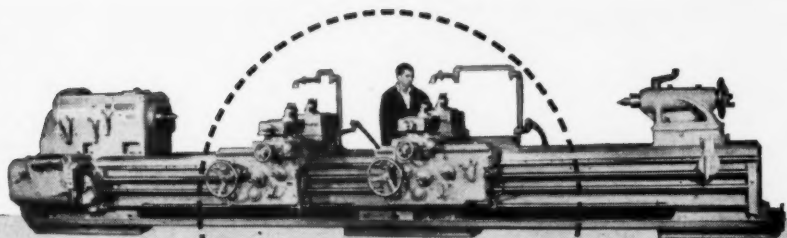
Preloaded ball bearing spindle. 9/16" collet capacity. Five speeds ranging from 400 to 4000 rpm. Vertical travel of spindle, 1 1/4". Table 4 1/8"x18". 90° swivel each side of center line.



## ELGIN TOOL WORKS

1772 Berteau Ave., Chicago 13, Ill.

If your production problems depend on the speed with which small parts are machined, an ELGIN may be your answer. The line of ELGIN High Speed Precision Bench Tools is designed to pay you dividends in better machining results, faster production and greater versatility. Write for specifications, prices.



## 2 Carriages ... 4 Cuts ... Many Uses

• To that headline we might add "Heavy cuts in half the time—with better finish", because that's the characteristic performance of the Monarch Heavy Duty Lathes with Dual Carriages.

To further reduce turning costs, the compound rests are furnished with rear rests. Independent and simultaneous feeds are provided, thus enabling the user to take four cuts simultaneously. Total amount of stock removal is divided between the front and rear cutting tools with the rear cut balancing and slightly following the front cut. Result—better finish in half the time.

May we show you how modern Monarch Turning Machines can increase your production—and your profits?

**THE MONARCH MACHINE TOOL CO., Sidney, Ohio**



**FOR A GOOD TURN FASTER — TURN TO MONARCH**



*They Like* **MANHATTAN CUT-OFF WHEELS**  
**at Empire Steel Castings**  
*Faster Cutting . . . More Cuts per Wheel*

That's the story of Manhattan Cut-Off Wheels on this Tabor machine in the plant of the Empire Steel Castings Co. at Temple, Pa. The operator photographed above is cutting off riser and gate on a high alloy stainless steel casting for a pressure valve insert. 16" x  $\frac{1}{8}$ " Manhattan Cut-Off Wheels give most satisfactory service, according to Empire cleaning shop foreman. "In fact, they wear down so evenly, we are able to use them in their reduced size for a lot of little grinding jobs around here."

Developments in both rubber and resinoid bonds have greatly increased the number of cuts per wheel, and improved the quality of cut. Manhattan Cut-Off Wheels are "pay-off" wheels. Be sure to try Mannhattans in your foundry and prove them for yourself.

**ABRASIVE WHEEL DEPARTMENT**



**RAYBESTOS - MANHATTAN INC.**

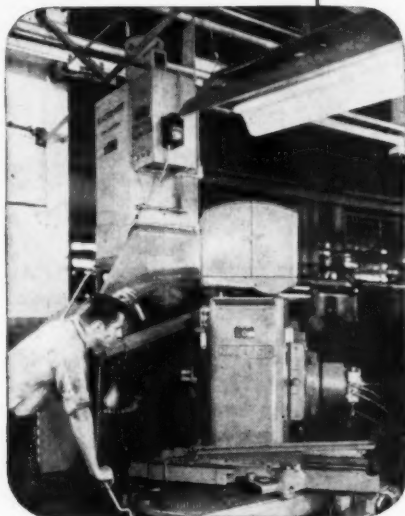
MECHANICAL RUBBER PRODUCTS — RUBBER COVERED EQUIPMENT — FRICTION MATERIAL — ASBESTOS TEXTILES  
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**MANHATTAN RUBBER DIVISION**

**PASSAIC, NEW JERSEY**

# *Electro*·MIST removes a hazard from high speed machining

**Oil "Smog" is controlled effectively  
by modern AAF Electronic Collector**



GEAR-CUTTING machines operating at high speeds throw off a penetrating "smog" made up of oil and smoke. It's a dangerous by-product that hampers worker visibility, results in unsightly deposits of an oily film on walls and equipment that constitutes both a fire hazard and maintenance problem. But this Gleason gear-cutting machine pictured at left is "smog-free", thanks to an AAF Electro-Mist.



AAF Electro-Mist, the electronic oil mist and smoke collector, is suspended above the cutting machine. The oil-laden "smog" is drawn directly into the collector. Smoke, oil and the smallest impurities are removed by electronic and mechanical filtration. The results? Time spent in maintenance and cleaning is cut—danger of fire is reduced—worker visibility is improved—more healthful operating conditions are created and the cleaned air can be returned directly to the work room.

And Electro-Mist pays its own way! As much as two to five gallons of oil can be salvaged daily and piped back into the machine or drained off.

AAF Electro-Mist is a self-contained and demountable unit. Removable plate assemblies allow cleaning of collector plates at convenient locations. The unit is designed for floor or overhead mounting. Ask your local AAF representative for Bulletin No. 251 or write direct to—

**AMERICAN AIR FILTER COMPANY, INC.**  
312 Central Ave., Louisville 8, Ky.  
In Canada: Darling Bros., Ltd., Montreal, P. Q.

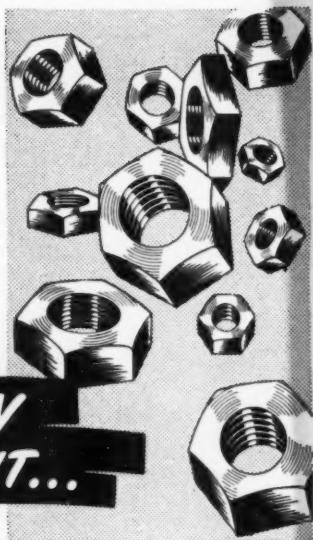


**AIR FILTERS**  
**AND DUST CONTROL EQUIPMENT**

**FROM** 25-125  
erratic threaded holes  
per tap

**TO** 22,000  
clean class 3 threaded  
holes per tap

**HERE'S HOW  
HY-PRO DID IT...**



**PART:** 18-8 stainless steel hex nut with punched hole

**PROBLEM:** Tapping with a 10-24 tap, a leading nut manufacturer experienced difficulty holding size and was troubled with excessive tap breakage.  
*Then They Called in the HY-PRO Sales Engineer*

**HY-PRO SOLUTION:** His recommendation was a standard Hy-Pro 10-24 machine screw tap with one of the exclusive Hy-Pro surface treatments for wear and lubrication. Speed and cutting oil were adopted from extensive tables in Hy-Pro catalog. Production with Hy-Pro taps now averages 22,000 burr-free Class 3 threaded holes at 62 nuts per minute.

Above is a typical example of how the Hy-Pro Sales Engineer can help increase threaded-hole production. His expert engineering counsel backed by the most up-to-date tap production methods combine to solve tapping problems rapidly and profitably.

**Rx**

Let Hy-Pro solve your tapping problem —  
call a Hy-Pro Sales Engineer today.

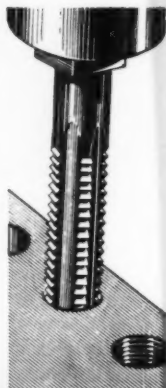
*Order from your Distributor*



**HY-PRO TOOL CO.**

**NEW BEDFORD, MASSACHUSETTS**

**A SUBSIDIARY OF CONTINENTAL SCREW COMPANY**



**LITTLE  
CHAMP**

**CUTS KEYWAYS IN...  
MILLING CUTTERS—PULLEY HUBS—GEARS—ETC.**

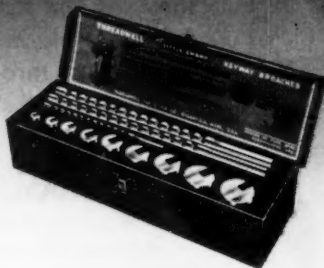


**IN LESS THAN A MINUTE!**

**BY SAVING MAN-HOURS IT PAYS  
FOR ITSELF IN NO TIME.**

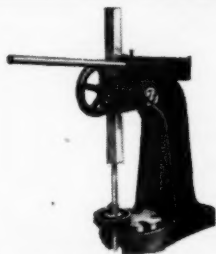
At some time or another every shop has occasion to cut keyways in gears, collars, pulley hubs, couplings or other miscellaneous parts, but these jobs never seem to call for an expensive setup. Compute the man-hours required to accomplish these infrequent jobs, however, and they'll come to a substantial amount. The combination of a Little Champ Keyway Broach Set and a Threadwell Arbor Press will handle these odd jobs efficiently and quickly. The Little Champ cuts standard keyways in an average speed of less than a minute. Can your shop match that time?

Little Champ Keyway Broach Sets in sturdy metal boxes with wooden fillers come complete with broaches, shims, and bushings in keyway sizes from 1/32" to 3/4" and in 14 models including both carbon and high speed steel broaches. We'd be glad to send Bulletin 434 giving detailed information.



**Threadwell**  
"TOOL OF DISTINCTION"

Threadwell Tap and Die Company, Greenfield, Mass., makers of Threadwell Taps, Fixed Gages, Dies, Counterbores, Twist Drills, and other fine cutting tools.



**THREADWELL RATCHET ARBOR PRESS**

This sturdy machine tool equipped with rapid hand wheel positioning is designed to cut accurate keyways up to 1/2" wide in a minimum of time. It has a leverage of 48 to 1 with a 15" hand stroke. Normal duty pressure provided is 1 1/2 tons. Height 23". Weight 155 lb.



# MILFORD WAVY SET BAND SAW BLADES

are setting new cutting records especially on horizontal band saw machines everywhere!

Users tell us . . . these Wavy Set blades are cutting better than 30% more metal . . . 50% more they say, on stainless steel . . . than any standard raker set blade. And cutting at closer tolerances! Why? Just three major reasons tell the story . . .


**FIRST** . . . the teeth are set into the back of the saw, which means added strength . . . and practically no tooth rippage.

**SECONDLY** . . . the wave helps clear the chips from the cutting area . . . resulting in straighter cutting and material increase in blade life.

**THIRD** . . . made by saw specialists . . . the originators of the WAVY SET BLADE . . . who have incorporated new principles in basic design and heat treatment.

Order from your Mill Supply Distributor. He is always ready to serve your needs for all industrial supplies, including MILFORD hack saw and band saw blades.

You owe it to yourself to test a Wavy Set blade on your own machine . . . right away.



Individually packed in cartons for easy handling.

## MILFORD

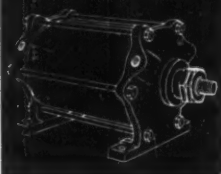
PROFILE AND  
BAND SAW BLADES  
REZISTOR AND DUPLEX  
HACK SAW BLADES

### THE HENRY G. THOMPSON & SON CO.

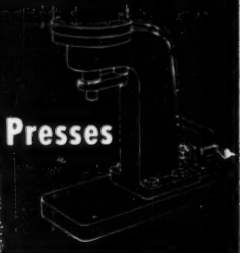
Saw Specialists Exclusively for over 70 Years  
NEW HAVEN 5, CONNECTICUT, U. S. A.

the **MODERN WAY** . . . to operate

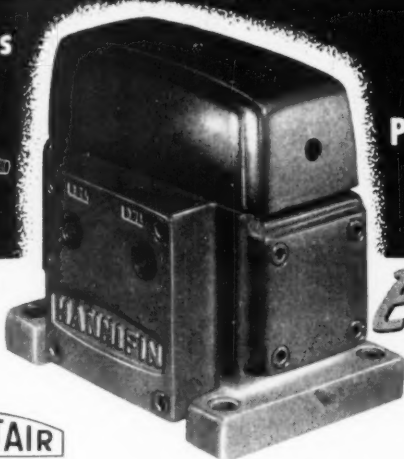
**Air Cylinders**



**Presses**



*New!*



*ELECTRIC*

**DIRECTAIR**

## **HANNIFIN**

### **Air Control Valve!**

**Nationwide  
Sales and  
Service**



**1101 So. Kilbourn Avenue  
Chicago 24, Illinois**

**SEE IT! TRY IT!** You'll be amazed at the difference it makes when you use this new Hannifin push button operated air control valve. Without effort, a quick, full power stroke every time! No throttling possible; no short-stroking. Use it to boost production.

**10 WATT SOLENOIDS** — No pounding . . . no noise . . . no relays needed. Solenoids continuously rated; only momentary contact required. Speeds of 180 cycles per minute, or more!

**PILOT TYPE** — Remarkably simple! An exclusive Hannifin development. Thoroughly tested. Air pressure does the work with a double-acting piston that operates stainless steel reciprocating disc. No packing or seals to maintain.

**NO PACKING TROUBLES** — Metal-to-metal lapped valve seat. Long life; little or no maintenance. Remarkably compact. Strikingly styled.

**TO MEET YOUR REQUIREMENTS** — Type I: Finger-tip control of advance and return cylinder strokes through two push buttons. Type II: Single push button control; equivalent to spring return valve action. 3-way or 4-way types. Ideal for remote control . . . building into equipment. Sizes  $\frac{3}{8}$ ",  $\frac{1}{2}$ ", and  $\frac{3}{4}$ ". For any pressure from 25 to 150 p.s.i. **WRITE FOR DESCRIPTIVE LITERATURE.**



LONDON and BIRMINGHAM

# BRITISH INDUSTRIES FAIR



Every year, from over 100 countries, trade buyers gather at the British Industries Fair. The Chamber of Commerce in Birmingham, and manufacturers from every part of Britain, join with the British Government to welcome them.

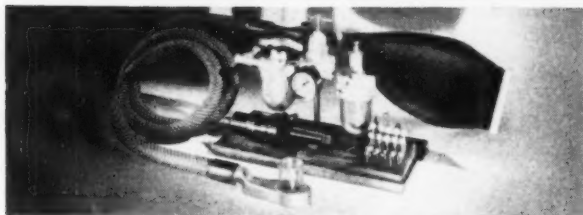
At BIF 1949, from 2-13 May, 3,000 exhibitors will display the latest developments in thirty groups of allied trades. The leading men of international commerce are invited to attend the world's greatest assembly of national products.

**2-13 MAY 1949**

**TRADE BUYERS—PLAN YOUR VISIT NOW**

Information about exhibitors, special displays and facilities at the Fair can be obtained from the nearest British Embassy, Legation or Consulate.

COMPLETE SYSTEM INCLUDES DUST ELIMINATION



## JIG GRINDING with the *Vulcanaire*

**W**HEN Jig Grinding is required you can have it quickly and economically with the Vulcanaire. Place in the spindle of your Jig Borer (or Mill).

**AND YOU CAN . . .** locate—finish grind holes in hardened steel to "tenths" at controlled speeds up to 65,000 R.P.M. . . grind dowel holes—square with a ground base . . . move location of holes in hardened steel blocks . . . grind interchangeable holes in hardened sections . . . grind .032 to  $\frac{1}{16}$ " holes with diamond impregnated laps . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . grind contours in gages . . . jig grind large and awkwardly shaped components . . . eliminate jig bushings in tools where close spacing is essential.

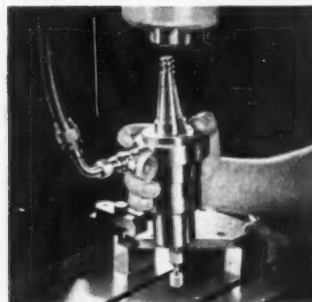
**RESULTS!** Jig ground requirements are being designed into tools by the most enlightened engineering departments . . . Jig ground the hardened die, stripper plate, and die holder all fit together . . . uniform clearance means longer runs.

**ADVANTAGES!** the investment is less than for many Jig Boring accessories such as a rotary table . . . the Vulcanaire can be put on and taken from the machine in a few seconds . . . the Vulcanaire is completely portable (all accessories are platform mounted) . . . the system can be used between several machines of various capacities . . . employing both

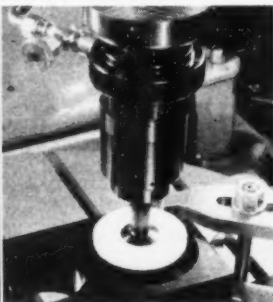
the 10,000 and 20,000 series, components with various sized holes from the very smallest to 4" in diameter can be Jig Ground . . . the average Jig Borer operator becomes proficient at Jig Grinding after very little experience.

**TOPS IN PRECISION . . .** the Vulcanaire is precision built throughout and is constructed of alloy and tool steel. Super precision bearings, preloaded with our special fixtures are used, with all traces of radial and end clearances removed, resulting in Vulcanaire Jig Grinding to "tenths" . . . for quotation and literature please mention machine tool application.

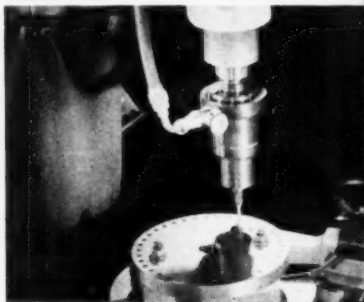
**VULCAN TOOL CO.**  
Highland Ave. and Lorain  
Dayton 10, O.



10,000 SER.  $\frac{1}{16}$ "- $\frac{1}{2}$ " HOLES  
PUT ON TAKE OFF EASILY



20,000 SER.  $\frac{1}{4}$ "-4" HOLES  
ADAPTORS INTERCHANGEABLE



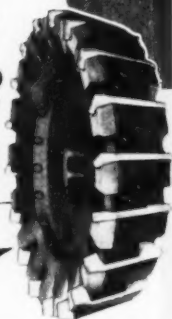
FOR JIG BORERS OR MILLS

# IF

YOU DO PRODUCTION MILLING ON CAST IRON...

## Are You Willing to Spend \$348.00--To Make \$3,336.50?

Then Read this  
Performance  
Report on the  
**AXIAL FACE  
KENNAMILL**



### Long Life and Extremely Low Maintenance Are Cost-Saving Advantages of Solid Blade Axial Face Kennamill

The operation detailed in the table is a production job where tooling costs are an important factor. It comprises straddle milling the top and bottom surfaces of cast iron cylinder heads.

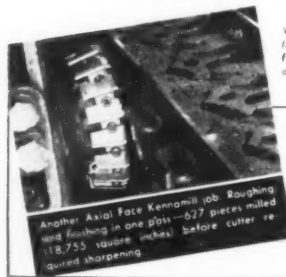
Use of the Axial Face Kennamill reduced milling costs on this job 80%. And this saving was made even though the competitive cutter was carbide-tipped, and performed exceptionally well.

The Axial Face Kennamill has extremely abrasion-resistant solid Kennametal blades, securely held in position by wedge construction, which prevents thermal strains and permits the high strength of Kennametal to be utilized. These blades can be sharpened at minimum expense in a standard tool and cutter grinder. No steel has to be ground. Only two readily-accessible blade surfaces need sharpening.

In the typical report shown at the right these facts stand out:

- Solid Kennametal blades last twice as long between regrinds
- More than 10 times as many regrinds can be made per blade
- Only one-half as much time is required to sharpen the cutter

Ask our representative to show you what solid blade Axial Face Kennamills can do on your cast iron milling jobs.



Another Axial Face Kennamill job. Roughing and finishing in one pass—627 pieces milled (18,755 square inches) before cutter required sharpening.

Write for Catalog 48. It describes Kennamills for most face milling operations.

Comparative Results	Competitive Cutter (Carbide Tipped Blades)	Axial Face Kennamill (Solid Kennametal Blades)
No. castings milled per 8 hr. shift	140	140
Number blades per pair of cutters	48	52
Cost per blade	\$1.20 (est)	\$4.20
Cost, two complete cutters	\$312.00	\$660.00
Number regrinds per blade	22	250
Number castings milled per grind	140	280
Number hours between grinds	8	16*
Blade cost per 8 hour shift	\$2.618	\$4.37
Blade cost per casting milled	\$.01870	\$.00312
Time to grind cutter	90 min.	45 min.
Hourly grinding cost (est)	\$4.00	\$4.00
Grinding cost per 8 hour shift or per 140 castings	\$6.00	\$1.50*
Grinding cost per casting milled	\$0.0428	\$0.0107
Total blade and grinding cost		
Per 8 hour shift	\$8.61	\$1.937
Per casting milled	\$0.0615	\$0.0138
Per year (2 shifts, 5 days, 50 weeks)	\$4,305.00	\$968.50
*Regrind once every other shift		
<b>Annual savings at an increased first cost of</b>		<b>\$3,336.50 \$348.00</b>



**"UNIVERSAL" FACE KENNAMILL**  
(Solid blades)



**"CF" KENNAMILL**  
(Solid blades)



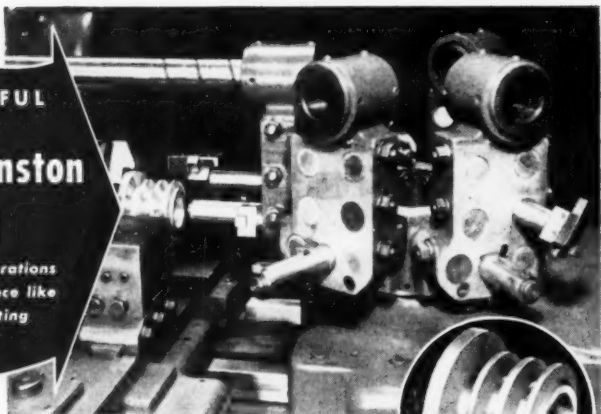
**STEP KENNAMILLS**  
(Kennametal—  
tipped blades)



**"ODD-JOB" FACE KENNAMILL**  
(Kennametal—  
tipped blades)

**IT TAKES SKILFUL  
TOOLING**  
**Potter & Johnston  
Tooling**

*To do 12 machining operations  
in 1.60 minutes on a piece like  
this aluminum pulley casting*



It takes years of experience and a special kind of engineering ingenuity to dope out the right combination of operations, turret face by turret face that results in better work and more of it per day at lowest cost per unit.

That is the particular specialty of P&J tooling engineers — proved time and again by outstanding parts production performance in the field.

That is why it is to your very great advantage to take your production problems to P&J — see what we have to suggest when you send us your parts or prints.

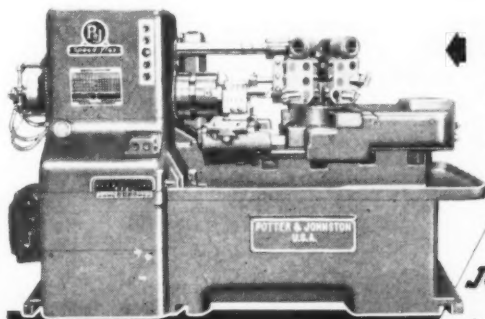
Tooling recommendations, estimates and time studies cost you nothing and may show the way to big savings. How about it?

**HERE IS THE JOB,  
ONE TURRET FACE AFTER ANOTHER**

- 1st T.F.: Bore hole halfway; rough turn O.D.; face end; rough and finish form "V" grooves; face flange.
- 2nd T.F.: Bore balance of hole; bore C-bore at front end; finish turn O.D.; face end.
- 3rd T.F.: Finish bore hole and C-bore.
- 4th T.F.: Machine grooves in bore (slide tool)
- 5th T.F.: Size bore hole 2.047" dia.

**HERE IS THE MACHINE  
THE P&J 3U SPEED-FLEX**

This Potter & Johnston Automatic Turret Lathe is specially designed for high speed production of small parts. It is equipped with four automatic speed changes and three automatic feed changes, electro-pneumatically controlled. It effects split second change of speeds or feeds or shift from the feed to the rapid traverse. It provides independent or simultaneous cross-slide operation with selected turret faces or with all six.



**3U SPEED-FLEX**

**Potter &  
Johnston Company**

**Pawtucket, R. I.**

subsidiary of Pratt & Whitney  
Division Niles-Bement-Pond Company





You know that Multiple Drilling slashes production costs. But do you know that the

## THRIFTMASTER "Universal"

IS THE

Highest Quality

...

Lowest Price

2-6 Spindles  
from \$158.00

Immediate Delivery

UNIVERSAL DRILLHEAD

**T**WENTY-FIVE YEARS of drillhead engineering experience is built into the rugged power of Thriftmaster heads. Quantity production, combined with modern equipment and skilled craftsmanship result in minimum prices. Check these important features:

...

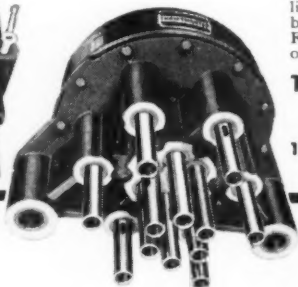
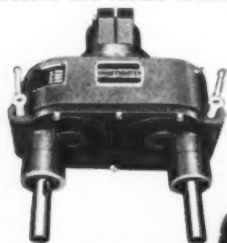
The superior construction of these versatile tools marks them as the outstanding investment for your present and future drilling jobs.

- Adjustable to any hole pattern
- Fits any drill press
- Close center distance Settings
- Maximum flexibility
- Proven performance
- Long life at full rated capacity

Write for name of our distributor in your area and for literature on Thriftmaster full ball-bearing Adjustable or Fixed Center Drillheads. No obligation, of course.

**Thriftmaster Products Corporation**

1030 N. Plum St., Lancaster, Pa.



# BROACHES AND BROACHING FIXTURES

*Exclusively!*

*for*  
**EVERY MAKE and MODEL  
BROACHING MACHINE..**  
*for*  
**EVERY APPLICATION**

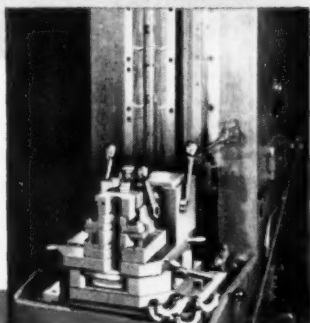
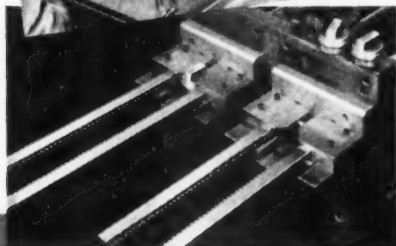
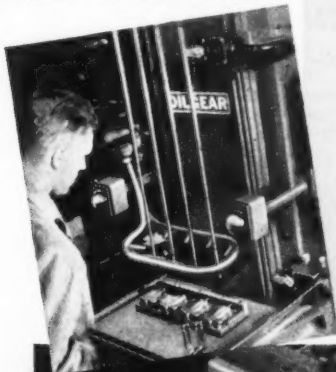
Detroit Broach Company manufactures broaches and broach tooling exclusively . . . for every type machine.

Through this specialization, the application and tooling of all types of broaching machines has become a thoroughly familiar procedure. This wide experience is used to aid you in the most efficient application of broaching machines for your jobs. Then, combined with the finest manufacturing facilities, this experience is applied to design and build broach tooling that will produce the most from every production-hour.

Have Detroit Broach consult with you on your broaching applications. We will gladly give you actual cost and production data for each job.

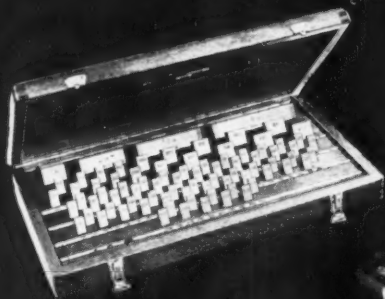
**DETROIT *Broach* COMPANY**

20201 SHERWOOD AVE. DETROIT 12, MICH.



# ONLY FONDA MAKES COMPLETE SETS OF Lifetime-Carbide GAGE BLOCKS

... in the full range of sizes



SET No. B2-C  
RECTANGULAR



SET No. B2-C  
SQUARE

## OUTLASTS ORDINARY STEEL GAGE BLOCKS

by 139 to 1

- ▶ Surface finish 0.15 to 0.3 micro inch rms. Almost absolute perfection.
- ▶ Superior wringing qualities — wring best when dry and clean, assuring greatest accuracy.
- ▶ Retains original accuracy and Surface Finish.
- ▶ Will not rust or corrode.
- ▶ Guaranteed against breakage.

Write for  
REPLACEMENT PLAN  
AND FREE CATALOG  
46-1



**FONDA**

**GAGE COMPANY**  
STAMFORD • CONNECTICUT

A recent analysis, made by one of the largest manufacturers of Office Machine Equipment, using a total of 260 sets of steel gage blocks, indicated that the cost of their gage blocks including a rigid inspection and replacement program amounted to \$466,000 during a ten year period.

Replacement of these steel blocks with Fonda Lifetime Carbide will result in a saving of \$538,000 over a period of only twenty years.

Our representative would be pleased to assist you in analyzing your steel gage block cost and point out the savings made possible by replacing steel with Fonda Lifetime Carbide Gage Blocks.

## also... FONDA ultra-finish<sup>®</sup> STEEL GAGE BLOCKS

... complete sets and individual sizes ... standard inch and metric measurements ... maximum accuracy, longer wear, finer finish and superior wringing qualities make Fonda Steel Gage Blocks superior to all others.

\* Fluid Power Improves Production

**"LOGAN" NEW,  
STANDARD  
FOOT-OPERATED  
VALVES**

With

EXCLUSIVE PISTON LATCH\*... PERMIT

**Dual Control  
FROM ONE TREADLE**  
OPERATOR'S HANDS LEFT FREE FOR OTHER WORK

**AIR AND  
HYDRAULIC MODELS**

**- 4-WAY, 2-POSITION TYPE**

To elevate heavy castings into position for the conveyor, the operator momentarily presses the treadle of the Logan foot valve controlling the pneumatic mechanism. With the valve piston latch set for *indefinite dwell*, the elevating cylinder is held at the end of the out stroke until a conveyor hook can be attached to the part. The operator presses the pedal again to lower the platform for receiving the next work piece.

Conventional operation may be obtained from the same valve treadle by turning the lever to place the latching mechanism in neutral. The exclusive piston latch is available in Logan foot-operated valves of both air and hydraulic types.

\* Design Reg. U. S. Pat. Off.

**\* ENGINEERING SERVICE**

Consult Logan engineers on any production power problem. This service is free for the asking.

**Logan**

**SAVES  
TIME  
EFFORT  
MOTION**

*Air and Hydraulic Equipment*

**LOGANSPOUT MACHINE CO., INC.**

807 Center Ave.  
Logansport, Ind.

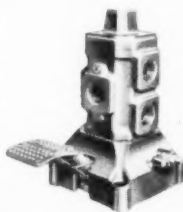
CHUCKS • CYLINDERS • VALVES • PRESSES • SURE-FLOW COOLANT PUMPS



Logan Dual Control Valves are highly compact; provide fast, positive action with effortless foot control; require infrequent maintenance service.

**MODEL 6520**

Air control valve for pressures to 150 p.s.i.



**MODEL 7025**

Hydraulic control valve for pressures to 1500 p.s.i.

**FREE CATALOGS**

Air valve catalog No. 90; Hydraulic catalog No. 85. Write for your copies.



**FLUID POWER SPECIALISTS SINCE 1916**

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

# Smart Carbide Users

## BRAZE & SAVE!

### Do You?



Are you taking advantage of the savings in money, time and headaches by brazing your own carbide tools with **ADAMAS TUNGSTEN CARBIDE?**

Brazing your own tools with durable **ADAMAS** carbide tips is simple, requiring no special equipment or technical knowledge.

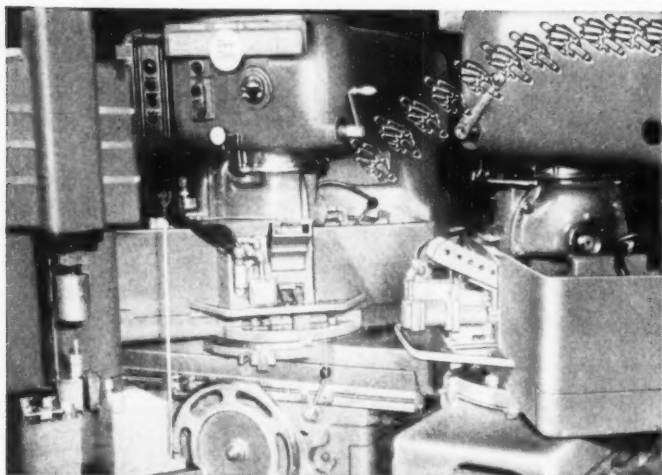
**How you save money—** ★ Shank steel and **ADAMAS** carbide tips are inexpensive. ★ Increased use of present tool room facilities. ★ Preformed **ADAMAS** tips require little grinding with costly diamond wheels. ★ Maintain economical low level of finished tool inventory.

**How you save time—** ★ Quick delivery on standard and special **ADAMAS** tips. ★ Eliminate costly down time waiting for tools. ★ Direct control of carbide tool production schedules.

Write for valuable free illustrated booklet "Brazing and Save" to Dept. B

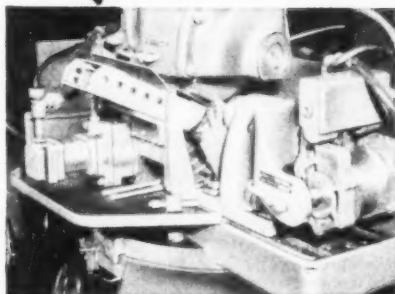
Convinced of the advantages and economy for carbide tool users, **ADAMAS** is concentrating on the job of maintaining the *fastest delivery schedule of quality tungsten carbide at lowest competitive prices.*

**ADAMAS CARBIDE CORPORATION**  
1000 South 4th Street • Harrison, New Jersey



automatic loading

# *Triples* Production of shaved gears



TYPE AND MODEL  
GEAR SPECIFICATIONS  
OPERATING IN FACTORY SHEDS  
AND SHEDS THROUGHOUT

The installation of Red Ring Gear Shaving Machines equipped with automatic loaders at the Warner Gear Division of Borg-Warner Corporation has practically tripled production of twelve tooth pinions.

These pinions have a 1" face, 13.5 D.P., 20° P.A. and are **DIAGONALLY** shaved to the Elliptoid tooth form. Tolerance on the involute is held to .0002". An arbor is pressed into each pinion before going into the loader magazine.

The operator merely feeds the pinions into the loader magazine and removes them when ejected from the machine completely shaved. Both loading and shaving are entirely automatic while the machines run continuously.

Red Ring Universal Diagonal Machines shave gears from 1" to 12" pitch diameter by either the conventional or diagonal methods.

If you are producing precision gears in quantity, ask for descriptive literature on Red Ring Shaving Machines.

2161

**NATIONAL BROACH AND MACHINE CO.**

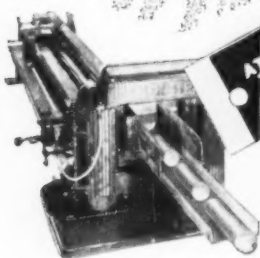
3400 ST. JEAN • • • • • DETROIT 12, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

# ATKINS Announces

## THE Nu-Mol

### POWER HACKSAW BLADE



LOOK at These  
Typical NU-MOL  
Performance Reports

NM 614P 249 pcs. 1" rd. SAE  
4140  
NM 4714 8 machines. 1 blade  
each 35,000 sq. in.  
4 1/2" sq. 1045  
NM 6718 9 hrs. continuous  
cutting stainless steel.

## ATKINS

E. C. ATKINS AND COMPANY • Home Office and  
Factory: 402 S. Illinois Street, Indianapolis 9, Indiana  
Branch Factory: Portland, Oregon • Branch Offices:  
Atlanta • Chicago • New Orleans • New York • San Francisco



MAKERS OF BETTER SAWS FOR EVERY CUTTING JOB

A New and Better  
Power Hacksaw Blade  
for High Production Cutting  
of Lower Alloy Steels

Twenty-five years ago Atkins introduced the first high speed steel hacksaws to be made in the United States. Today, in their field, Atkins "Silver Steel" Hacksaws are still the finest blade made . . . excellent for sawing any of the high carbon, tough jobs, or any other steels that can be cut with hacksaws.

NOW, in the field of sawing lower alloy steels, where high production cutting is essential, the NU-MOL rounds out the Atkins line of blades that covers every type of hacksaw requirement.

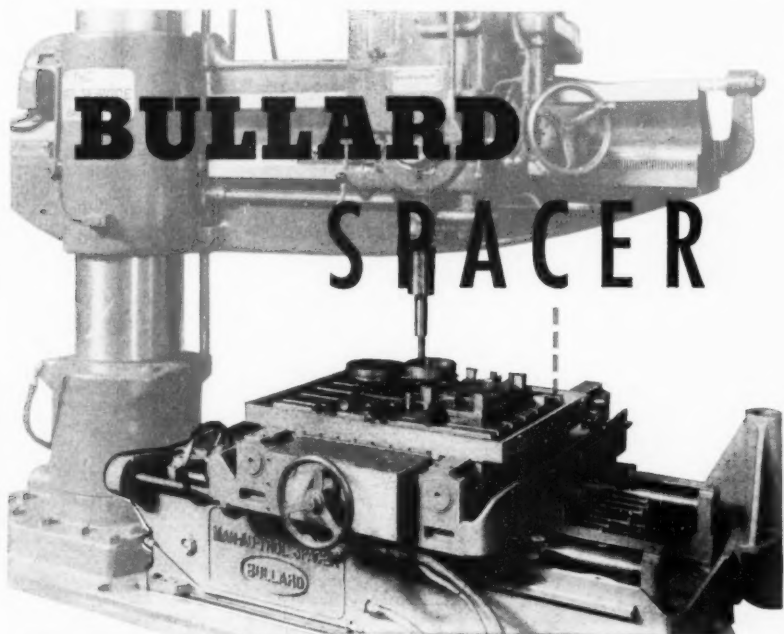
NU-MOL is the result of years of metallurgical research, from which have developed new methods of manufacturing and heat treating.

NU-MOL is a tough, yet exceptionally flexible power hacksaw blade. It reduces blade breakage to a minimum. Its teeth stay sharp longer with little chipping. Resistance to abrasive action is excellent.

NU-MOL cuts fast and clean to extremely close tolerances. NU-MOL reduces your costs due to longer blade life.

Find out what NU-MOL can do for you. Ask your Industrial Distributor to demonstrate the new NU-MOL performance on your own cutting jobs. Get in touch with him today.

NU-MOL Power Hacksaw  
Blades are Packaged 10 to  
a Box.  
Available in all standard  
lengths and tooth sizes.



## **ELIMINATES . . . Hole-Locating Jigs and Fixtures**

This unit applied to radial drills having accurate drill spindles, is proving a highly successful cost reducing method for drilling short or long run jobs without the need for expensive jigs or fixtures.

It is competitively accurate and in many cases faster than conventional jig borers.

Drilling, boring, reaming and tapping operations have been speeded up and costs reduced by many users of this equipment.

To meet the future economic pressure investigate this manufacturing method. Ask BULLARD Engineers about satisfied users. Write today.

**THE BULLARD COMPANY**  
BRIDGEPORT 2, CONNECTICUT

*Illustrated...*  
**30 x 20 SPACER**

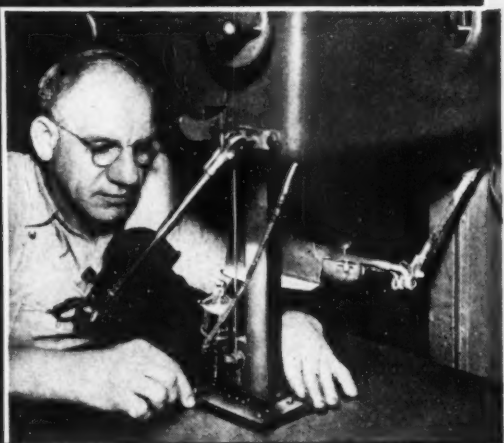
— Bullard 30 x 20  
Spacer processing three different parts in one set up. All pieces located within  $\pm .0005$ . Such a set up is especially profitable on small lot production.

**BULLARD**

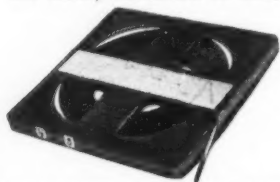
# *Specify* ATLANTIC

BAND SAW BLADES

## *For* *Smoother* CONTOUR CUTTING



*A*TLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

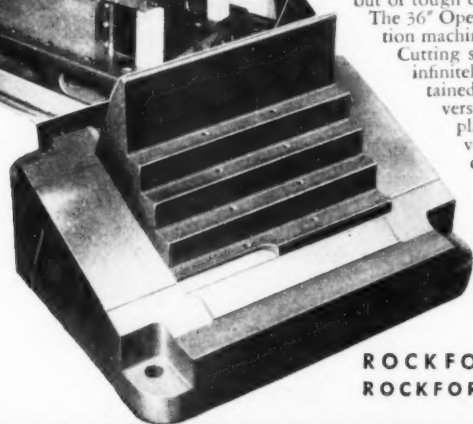
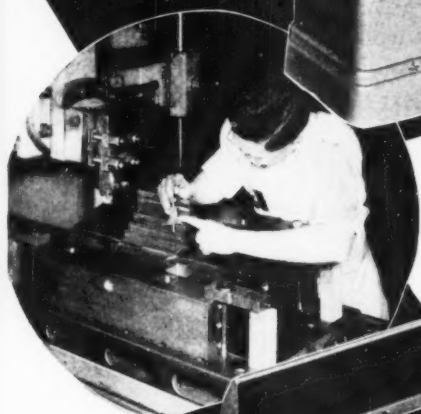
*Atlantic Saw Mfg. Co.*  
INCORPORATED

Exclusively Manufacturers of Band Saw Blades

153 Brewery St., New Haven, Conn.

# WANTED:

## Tough Assignments for this machine



### ROCKFORD *Hy-Draulic* 36" Openside Shaper

It invites hard jobs, the kind that are too difficult for ram type shapers . . . jobs like this compound angular die for Burrough's Adding Machine Company's Card Index Case . . . cut out of tough die casting steel to a tolerance of 0.003".

The 36" Openside Shaper is an exceptionally fast production machine, too. Set-ups are quickly and easily made. Cutting speeds range up to 110 ft. per min. and are infinitely adjustable, with the cutting stroke maintained at uniform speed from start to finish. Reversal is quick and return rapid. Full-length, planer type table support permits machining of very large or heavy work . . . and assures exceptionally high precision cutting, often eliminating the need for further finishing operations.

It will be well worth your while to find out how a Rockford *Hy-Draulic* Shaper, Planer, Shaper-Planer or Slotter might speed up or improve operations in your shop. Send your blueprints to our engineering department and we will furnish machine time estimates for comparison.

**ROCKFORD MACHINE TOOL CO.**  
**ROCKFORD ILLINOIS**

4807

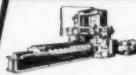
*Hy-Draulic*

REG. U. S. PAT. OFF.

SHAPERS



PLANERS



SLOTTERS



SHAPER-PLANER



# REDUCE "REJECTS"

with  
**Glenco**



## Compensating TOOL HOLDERS

These tools automatically compensate for spindle misalignment up to  $\frac{1}{16}$ " diameter ( $\frac{1}{32}$ " radius), assuring perfectly sized holes of uniform diameter in drilling, reaming and tapping. Set-up time and tool breakage are reduced to a minimum. "Rejects" due to bellmouth or oversize holes are eliminated.

### 26 TYPES

Send for Index J Data Sheets

Test any stock size 30 days without obligation

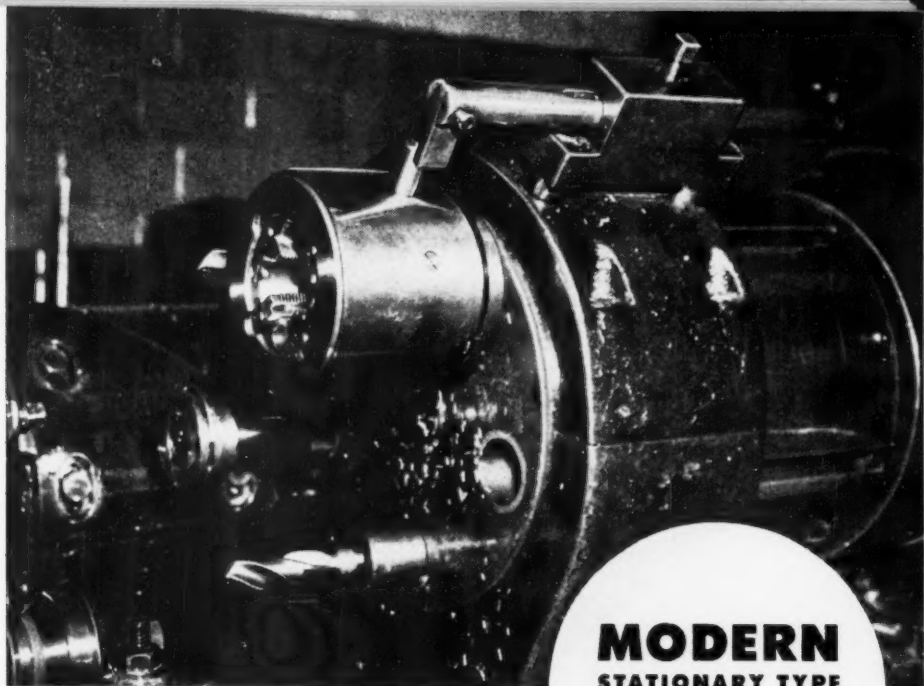


**Utility  
Tools**

THE J. C. **GLENZER** CO., Inc.

6465 EPWORTH BLVD.

DETROIT 10, MICH.



Here a Modern Stationary Type Self-Opening Die Head is shown in operation on a Cleveland Automatic. The die head's floating shank compensates for any difference between the lead of the cam of the machine and the thread to be cut.

## MODERN STATIONARY TYPE SELF-OPENING DIE HEADS

Modern Precision Tools  
Include . . . .

STATIONARY SELF-OPENING  
DIE HEADS  
ROTARY SELF-OPENING  
DIE HEADS  
STATIONARY  
COLLAPSIBLE TAPS  
ROTARY  
COLLAPSIBLE TAPS  
MODERN-MAGIC  
CHUCKS AND COLLETS  
SELF-OPENING  
STUD SETTERS  
INSERTED BLADE  
FACE MILLING CUTTERS  
SOLID ADJUSTABLE  
DIE HEADS  
ADJUSTABLE HOLLOW  
MILLING TOOLS  
UNIVERSAL CHASER  
GRINDING FIXTURES

The line of standard Modern Stationary Type Self-Opening Die Heads thread diameters from  $\frac{1}{8}$ " to 7" in standard heads and up to 14" in special heads, accurately, fast and economically. They are adapted to practically every thread cutting operation within their capacity. Designed for use in hand screw machines, turret lathes and other machines where the die head is used in a stationary position and the work revolves.

Complete information will  
be furnished upon request.

# MODERN TOOL WORKS

DIVISION OF  
CONSOLIDATED MACHINE TOOL CORPORATION  
ROCHESTER 10, NEW YORK

# Clausing PRECISION LATHES



## MODEL 224

1" collet capacity  
 $1\frac{3}{8}$ " bore through spindle  
 $12\frac{7}{8}$ " swing over bed  
 $7\frac{5}{8}$ " swing over carriage  
 36" between centers

25 other models  
 from \$264.00

## OUTSTANDING IN EVERY WAY WITH *Accuracy* THAT "STAYS PUT"

The Clausing Model 224 Lathe is an example of the very latest in modern machine tool design and engineering. Special attention has been given to features demanded by today's high speed production and tool makers' requirements. In its capacity range, it represents a high advancement in the combination of speed, convenience, versatility and long life.

Clausing Lathes are precision built for precision work. The bed is a solid close grained grey iron casting made rigid by inverted U and box braces. All beds are rough milled, seasoned, then rough and finish ground. Vee and flat ways are machined to within .001 inch of parallelism. Husky carriage is gibbed both front and back to prevent climbing and maintain maximum rigidity. Accurately cut and smooth faced gears assure extreme accuracy and quietness of operation.

Write for Complete Literature

## 10 Star Features

- Headstock sealed, running in oil
- Gearbox sealed, and running in oil
- Infinite speed selection
- Enclosed motor drive
- Automatic lever controlled apron
- Tapered nose, key laced spindle
- Spindle forged, hardened, and finally ground rotating on its own precision type TIMKEN tapered roller bearings
- Hand-wheel type, spindle back-gear engage
- Back and reverse gears enclosed in headstock
- Easily removed double drive belts



**CLAUSING MANUFACTURING CO.**

231 RICHMOND AVENUE, OTTUMWA, IOWA

Since 1931

**ACTUAL PERFORMANCE TEST PROVES THERE  
IS NO SUBSTITUTE FOR V-R CARBIDES**

**DETAILED REPORT:**

**MACHINE:  
OPERATION:  
MATERIAL:  
TOOLS:**

14 1/2" South Bend Lathe.  
Boring Fusion Cup for Calorimeter.  
Bore face, bottom and outside rim.  
99% Nickel.  
3/4" Diameter by 8" Long V-R Carbide  
Tipped Boring Tool.

**COMPARATIVE PERFORMANCE**

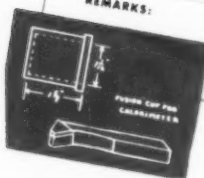
**S. F. M.:  
F. R. REV.:  
DEPTH OF CUT:  
PCS. PER GRIND:**

**V-R Carbide  
Grade EH**  
225  
.002  
.020  
20

**Other  
Carbides**  
140  
.002  
.020  
2 to 6

**REMARKS:**

V-R Carbide Tipped Tools eliminated off-tolerance  
rejections and produced outstanding increases in  
pieces per grind. Quality of finish resulted in reducing  
polishing time from 40 minutes to 15 minutes.



Baltimore, Md.  
Plaza 1734  
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Jefferson 6688  
Cleveland, O.  
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Detroit, Mich.  
Cadillac 0583-4  
Hartford, Conn.  
32-5197  
Houston, Tex.  
Wayside 1530  
Indianapolis, Ind.  
Riley 3946  
Los Angeles, Cal.  
Richmond 4682  
Milwaukee, Wis.  
Division 0204  
New York, N. Y.  
Yankers 8-8170  
Peoria, Ill.  
3-5837  
Philadelphia, Pa.  
Gladstone 5-0500  
Pittsburgh, Pa.  
Hiland 8548  
Richmond, Ind.  
6057  
Rockford, Ill.  
4-0731  
San Francisco, Cal.  
Garfield 0817  
St. Louis, Mo.  
Newstead 3110  
Sydney, N. Y.  
3-0334  
Worcester, Mass.  
6-8792

In this and in thousands of other actual machining operations V-R Carbide tools have proven their superiority in eliminating off-tolerance rejections and producing outstanding increases in pieces per grind.

Vascoloy-Ramet carbide tools and blanks are offered in an almost unlimited choice of styles, grades and dimensions to meet any industrial requirement.



**CALL** your nearest V-R Branch Office today for an effective and economical solution to your production problems.



**VASCOLOY-RAMET CORPORATION WAUKEGAN ILLINOIS**  
District Sales and Service in Principal Cities

An affiliate of The Foxsteel Metallurgical Corporation and The Vanadium-Alloy Steel Company

# WHYTE

ENGINEERING CO.

## WHYTE ROLL FEEDS

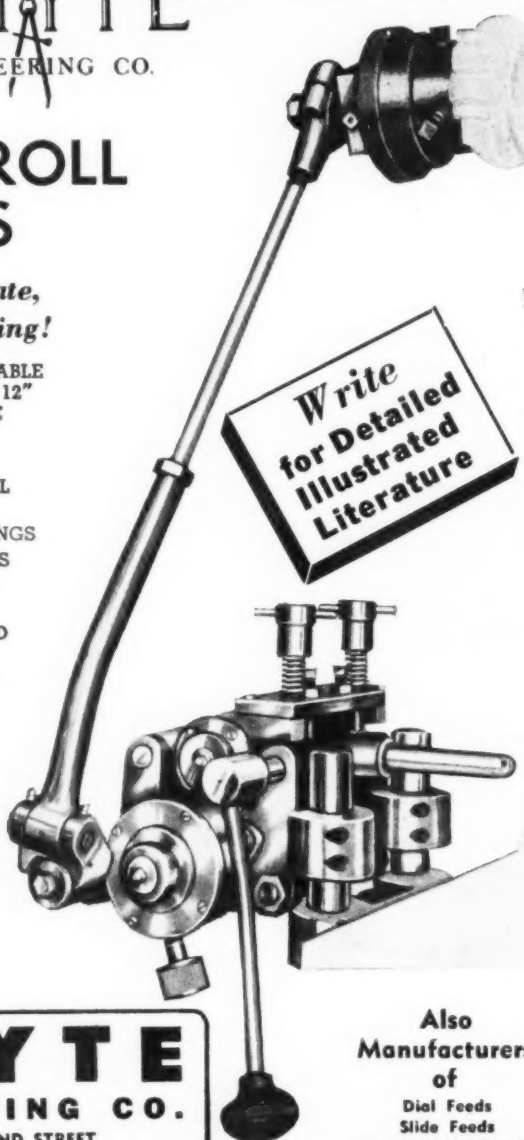
*for Fast, Accurate,  
Continuous Feeding!*

- STOCK MODELS AVAILABLE TO FEED FROM 0" to 12" AND UP TO 14" WIDE
- LARGER MODELS ON REQUEST
- RUGGED WELDED STEEL CONSTRUCTION
- TIMKEN ROLLER BEARINGS
- ALL CUT STEEL GEARS
- EASILY ADJUSTED TO PROPER DIE HEIGHT
- SINGLE AND DUAL FEED AVAILABLE
- ALL FEEDS WITH TWO ROLL LIFTS, AUTOMATIC AND MANUAL FOR CONVENIENT LOADING OF STOCK



*Immediate  
Delivery*

**WHYTE**  
ENGINEERING CO.  
185-1 ROWLAND STREET  
SPRINGFIELD 7, MASS.



**Also  
Manufacturers  
of**

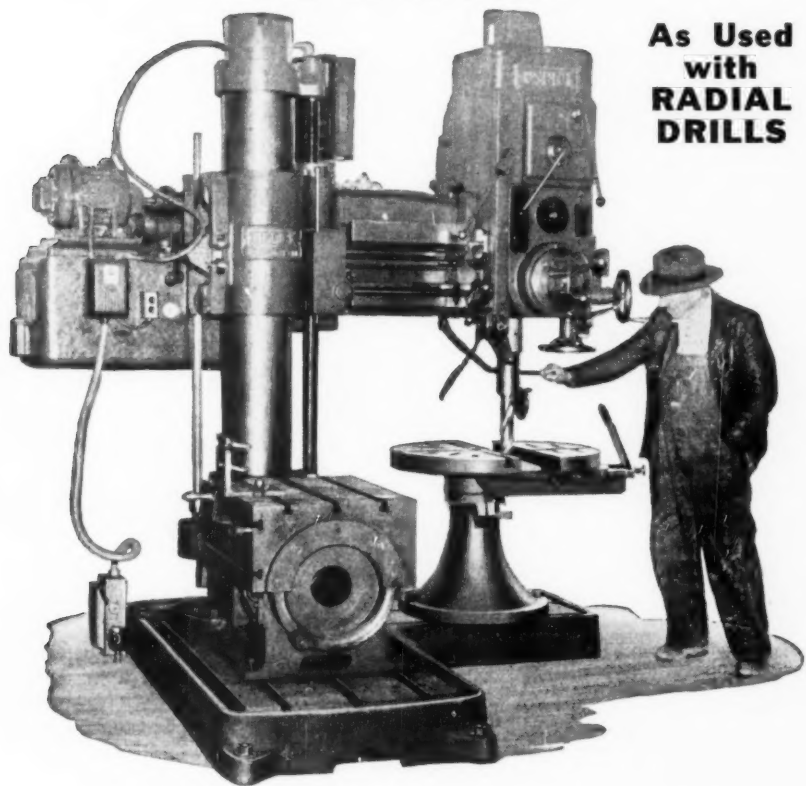
Dial Feeds  
Slide Feeds  
Pick-Off Attachments  
Stock Straighteners  
Lamination Dies

# ***SAFETY DRILL TABLE***

**Mounted on Pedestal**

**which we can furnish**

**As Used  
with  
RADIAL  
DRILLS**



A time-saving tool that we will be glad to  
ship you for FREE TRIAL. Write for Catalog.

**MODERN MACHINE TOOL CO.**  
*Jackson, Michigan*

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# Precision ROD CUTTING at High Speed



with the New  
**DI-ACRO  
ROD PARTER**

The DI-ACRO Rod Parter further increases the range of "DIE-LESS DUPLICATING" as a real cost-cutting, time-saving production technique so well established by the DI-ACRO Benders, Brakes and Shears.

**Do you require precision?**—The DI-ACRO Rod Parter holds tolerance to .001" on duplicated cuts. The ends are square, and roundness is maintained.

**Do you want speed?**—The Rod Parter exceeds output of other methods with equal accuracy, on rods and bars up to 5/8" Torrington Roller Bearings incorporated in an exclusive multiple leverage arrangement provide remarkable ease of operation.

## GET "DIE-LESS DUPLICATING" CATALOG!

Shows parts produced without die expense or delay by DI-ACRO Benders, Brakes, Shears, Rod Parters, Notchers, Punches. Send for your free copy.

Pronounced "DIE-ACK-RO"

### "PARTS OFF" MANY MATERIALS

All hot and cold rolled rods

Stainless steel

Chrome Molybdenum

Copper

Brass

Aluminum

Bi-metals

Many types of plastics

Fibre Rubber Wood



**O'NEIL-IRWIN mfg. co.**

314 EIGHTH AVENUE, LAKE CITY, MINNESOTA



"THE CREST  
OF QUALITY"

## Adds to the Prestige of Any Lathe

Though your lathe belongs to the Who's Who of Machine Tools, its standing will improve when it's equipped with a Skinner Chuck. This soundly designed tool is built to the highest standards to insure precision performance while increasing the productivity of any lathe.

Illustrated above is an independent chuck, one of the complete line of hand- and power-operated lathe chucks and chucking equipment made by Skinner. With a heavy, accurately machined body and rugged, individually adjustable jaws, it speeds the machining of round or odd-shaped pieces by holding the work securely and precisely for either heavy roughing cuts or fine finishing operations to extremely close tolerances.

Perhaps you are interested in replacing chucks on your older equipment. Perhaps you are buying or building new machine tools. In either case, add to the prestige of your lathes—use Skinner chucks, "The Crest of Quality." Write for the new Catalog No. 60 describing complete line of Skinner chucking equipment and machine vises.

The Skinner Chuck Co.  
340 CHURCH STREET, NEW BRITAIN, CONN.

**Skinner  
Chucks**



HAND & POWER OPERATED MACHINE CHUCKS - AIR CHUCK EQUIPMENT - FACE PLATE JAWS - MACHINE VISES

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85

# MAKE 1 TAP

# DO THE WORK OF 6

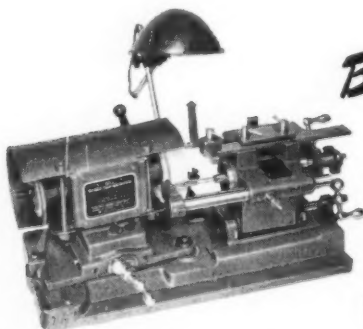
with

## Blake

TAP GRINDERS

Users everywhere report increased tap life of 600% and more when Blake Tap Grinders are on the job. (One large user actually reground a single tap 32 times!) Actual tests show that after each grinding both chamfer and relief equal or surpass original tap for accuracy and uniformity. And that's not all — set-ups on Blake Tap Grinders are virtually foolproof, allow little chance for error . . . even unskilled help can grind an average tap accurately in less than one minute.

The answer to economical tapping is the Blake Tap Grinder. Get complete details by sending for free illustrated bulletin — fill out and mail coupon today!



PICK THE MODEL

*Best* FOR YOUR SHOP!

No. 1 for taps up to 6" long;  
No. 2 for taps up to 14". Both  
models grind right or left hand  
taps with 2, 3, 4, 5, 6, 8 or 10  
flutes in sizes from No. 0 to 2½"  
Choice of three mounting methods:  
on centers, on shank, or on thread.

EDWARD

## Blake

COMPANY

Please send me complete details on  
The Blake Tap Grinder

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

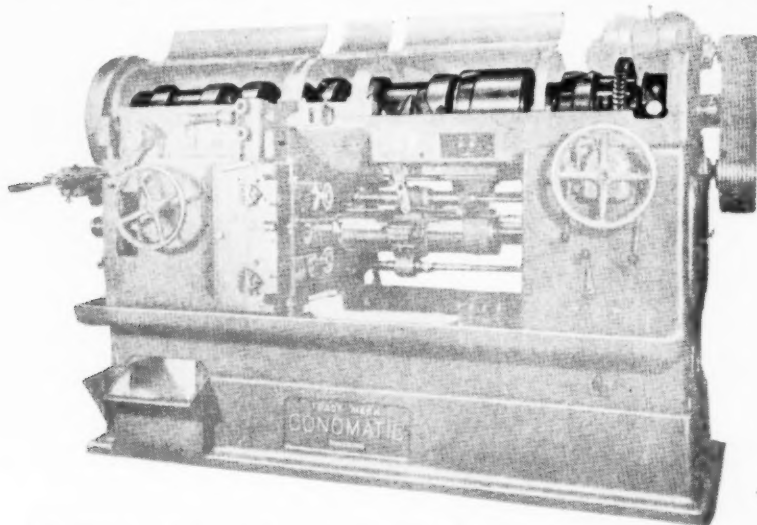
CITY \_\_\_\_\_ STATE \_\_\_\_\_

437 Cherry St.

West Newton 65, Mass.

Blake Tap Grinders — Blake Flute Grinder  
American Tool Holders — Black Diamond  
Precision Drill Grinders — Waltham Cutter  
Sharpeners — Waltham Thread Millers  
Surface Finish Standards.

# Everything Under CONTROL



The CONE Frame Design centralizes cam control outside of the tooling area, clear of chips. All cams, visibly accessible, have a stabilized high-point and are jig drilled. Change is easily made by removing a few screws.

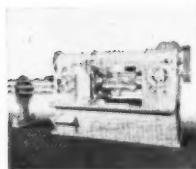
There is no satisfactory substitute to date for a good cam system, but the relative importance of its features should not be confused. Those that control and transfer smooth, positive power, to tool slides and other machine units, are of major importance. A feature of cam change facility, though useful, is less important.

Long runs, or "grouped" short runs, require minimum cam change, and the time for changing cams on any "automatic" is only a fraction of the total required for complete job change-over. A mere turn of a dial changes the working stroke of any slide on the 1" CONOMATIC, but this facility is of minor importance compared to the major advantages of the machine's CONE Cam System.

Any good investment has certain qualifications that prove it profitable. The wise investor and smart banker have some sort of measuring stick to analyze every investment they make. Why not use a chart to guide your purchases of Automatic Bar Machines? If you are already using a chart, perhaps you would like to compare it with the one that we have prepared. Write to us for a copy or ask your Cone representative.

	MACHINE #1	MACHINE #2	MACHINE #3	MACHINE #4	MACHINE #5
WORK & TOOL CAPACITY	✓				
WORK & TOOL SUPPORT	✓				
WORK & TOOL MAINTENANCE	✓				

CONOMATIC



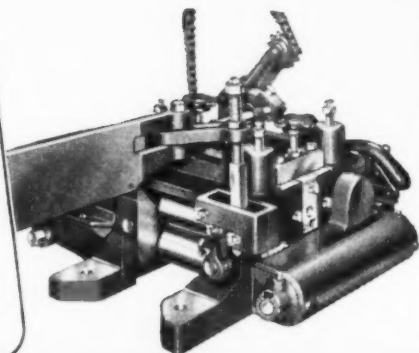
A comparison with ALL Automatics  
will lead you to

#5

## Conomatic

CONE AUTOMATIC  
MACHINE COMPANY, INC.  
WINDSOR, VT., U.S.A.

**Assures Fast  
Safe-Accurate  
Feeding of  
Coiled Strip Stock**

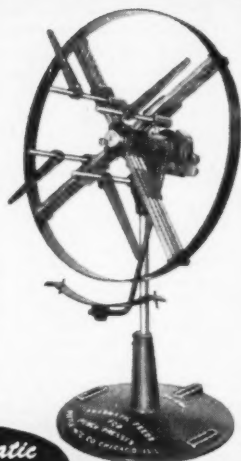


## **WITTEK** *Automatic* **ROLL FEEDS AND REEL STANDS**

### **For All Types of Punch Presses**

Wittek *Automatic Roll Feeds* provide maximum efficiency in the high speed automatic feeding of all types of coiled strip stock to punch presses. Highly flexible in function and application, they are capable of feeding lengths up to 24" per stroke of the press and will handle various stock thicknesses in widths up to the maximum width of the rollers.

Wittek *Adjustable Reel Stands* provide automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and back lash of stock. If your production problem involves feeding coiled stock to punch presses, consult us. Your inquiry will be given immediate attention. Ask for completely descriptive catalog.



### **WITTEK Manufacturing Co.**

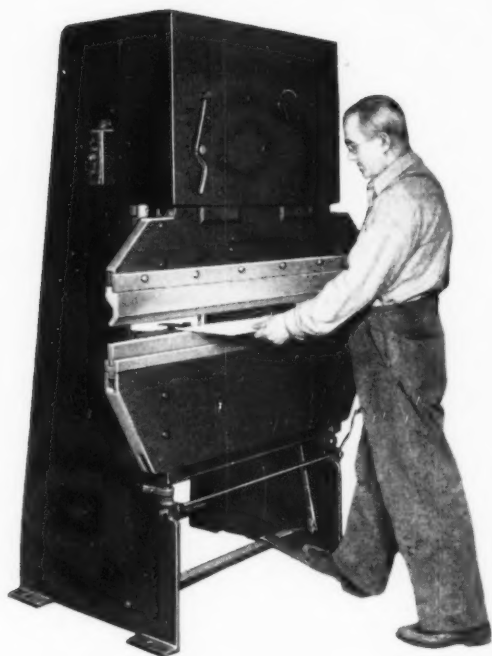
4321 W. 24th Place, Chicago 23, Illinois

*Automatic*  
**ROLL FEEDS  
and  
REEL STANDS**



# CHICAGO

## STEEL PRESS BRAKE



### MODEL NO. 131

A new member of the Chicago Press Brake family designed to supplement the larger machines.

Within its rated capacity (11 tons) all operations are handled same as on the larger machines.

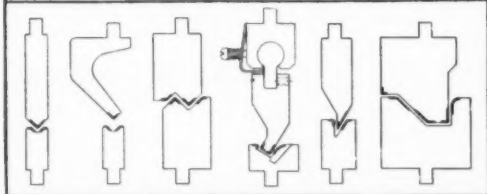
All steel construction, enclosed gearing.

Takes up small floor space.

We can make excellent deliveries of this new press.

We make complete line of dies for all Press Brakes.

INDUCTION-HARDENED DIES  
A GREAT ADVANCE IN DIE MAKING



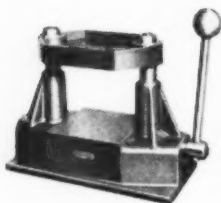
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further description

**DREIS & KRUMP MANUFACTURING CO.**  
7440 LOOMIS BLVD. • CHICAGO 36, ILLINOIS

# N. A. WOODWORTH

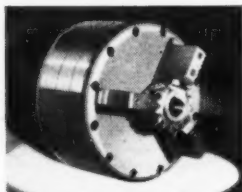
## ENGINEERED PRODUCTS

### ACCURACY YOU CAN TRUST



CONE-LOK JIGS

Chucks engineered and built by Woodworth guarantees the ultimate in precision gear chucking. ➔



DIAPHRAGM CHUCKS

➔ Woodworth Cone-Lok Jigs are noted for their mechanical simplicity and "life-time" construction.



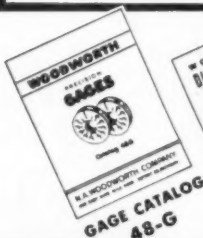
PRECISION GAGES

Woodworth manufactures a complete line of thread ring and thread plug as well as cylindrical plug and ring gages. Also produces special gages to customer blueprints.

N. A. Woodworth engineering gives you plus value in precision parts. Production men with "know-how" combined with well equipped plant are pace setters in aircraft engine and radar assembly fields.



PRECISION PARTS



GAGE CATALOG  
48-G



CHUCK CATALOG  
49-C



JIG CATALOG  
46-J

#### WRITE FOR LITERATURE

New, comprehensive catalogs on N. A. Woodworth chucks, jigs and gages. Precision parts data supplied upon request for specific information. All inquiries should be on your company letterhead and mailed to address below.

# WOODWORTH

N. A. WOODWORTH CO., 1300 EAST NINE MILE ROAD • DETROIT 20, MICHIGAN  
PRECISION GAGES • DIAPHRAGM CHUCKS • CONE-LOK JIGS • PRECISION PARTS

# KRW PRESSES *help build* BETTER LAWN MOWERS

## CLEMSON BROS., INC. USES A BATTERY OF 10 KRW 25-TON PRESSES TO BOOST PRODUCTION

● Clemson Bros., Inc.—nationally known manufacturers of quality lawn mowers and Star Hacksaw blades and frames...utilizes a battery of ten KRW 25-ton motor-driven hydraulic presses to perform a wide variety of production operations. They say..."The use of KRW Presses in our plant has increased production." The ingenious manner in which standard low-cost KRW presses have been adapted to specific jobs by this manufacturer reflects great credit on the calibre of their production and engineering executives. KRW Presses are highly adaptable. Best proof of this can be found in the many thousands in daily use in almost every industry. They can be furnished for either vertical or horizontal ram travel. Distance between uprights can range from 1 foot to 7 feet or better. Daylight,



*Two of a battery of Ten KRW Presses in daily use at Clemson Bros., Inc. at Middletown, N. Y.*

from inches to six feet and more. This is flexibility at low-cost. KRW Press tonnages vary from 25 to 100-ton capacity. They are available either hand-operated, air-operated or motor-driven. Tell us your problem...we are equipped to engineer the press to the job. Mail the coupon for the facts.

**GET THE FACTS!**

**MAIL THE COUPON TODAY!**

# K·R·WILSON

215 MAIN ST. · BUFFALO 3, N. Y.

K. R. WILSON, 215 Main St., Buffalo 3, N. Y.

Please send me information on KRW Hydraulic Presses.

☐ Hand-Operated    ☐ Air-Oil Operated    ☐ Motor-Driven

Name .....

Address .....

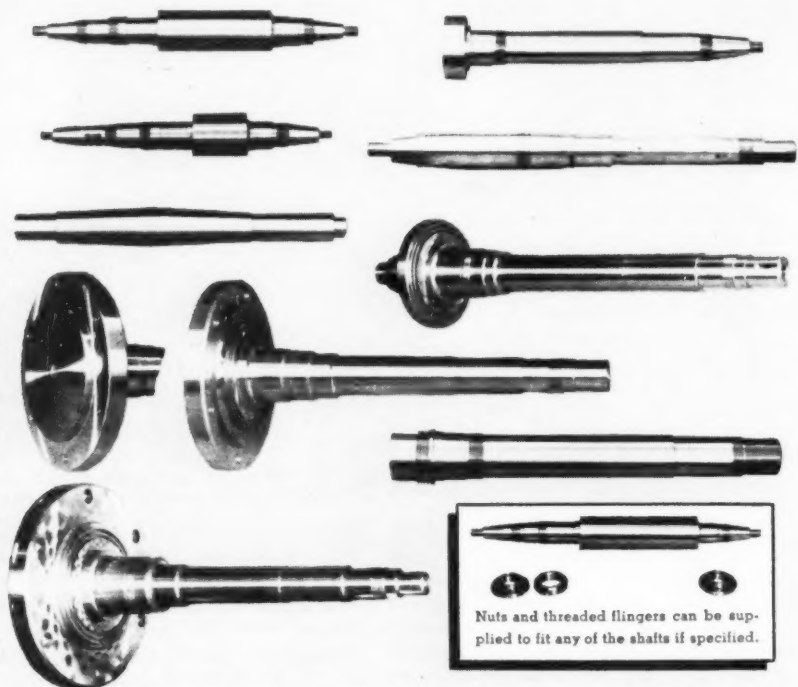
City and Zone ..... State .....

# POPE

## PRECISION SHAFTS

We are now in a position to supply precision shafts made to your own designs and specifica-

tions as to material and tolerances, with ground threads and dynamically balanced if required.



Nuts and threaded flingers can be supplied to fit any of the shafts if specified.

Send us drawings and specifications and let us quote on your requirements

No. 57

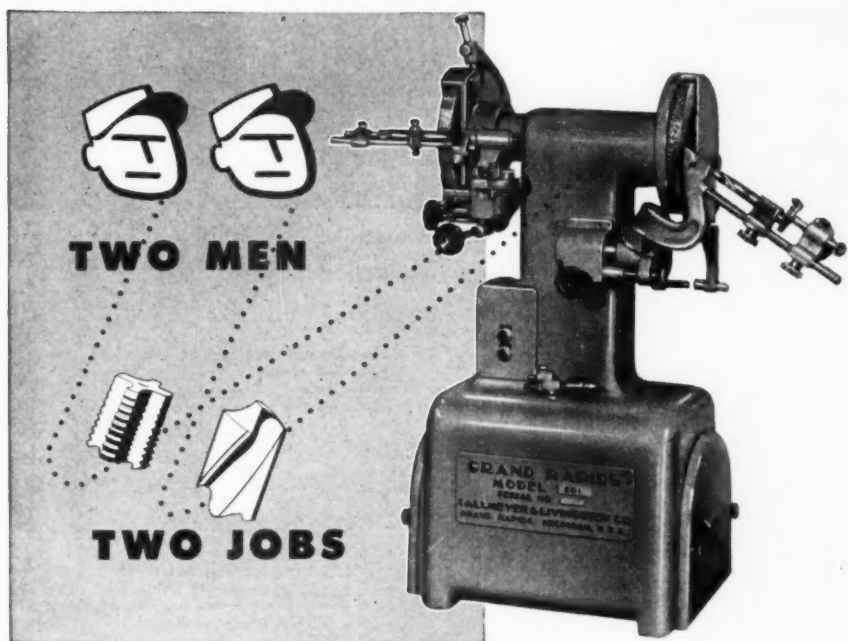
# POPE

TRADE MARK REG. U.S. PAT. OFF.

**POPE MACHINERY CORPORATION**

ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS  
BUILDERS OF PRECISION SPINDLES



## ONE MACHINE

● Working simultaneously, these men save time, floor space and maintenance costs in your tool room. Providing them with the facilities of two single-purpose machines, the Grand Rapids Tap and Drill Grinder accurately sharpens worn taps and drills to the correct cutting and clearance angles required for precision work. The rigid spindle is ruggedly built to resist heavy combined radial and thrust loads, and large wheel guards and flanges insure maximum safety. Grinding surfaces are dressed by a new, diamond truing device. The long life of this machine is assured by Grand Rapids' widely recognized reputation for sturdy, heavy-duty construction.

To serve you — Your inquiry concerning your specific grinding needs will receive prompt attention.  
Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter Grinders, Hand Feed Surface Grinders, and Combination Tap and Drill Grinders.



**GRAND RAPIDS GRINDERS**

405 STRAIGHT AVE., S.W., GRAND RAPIDS 4, MICHIGAN

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

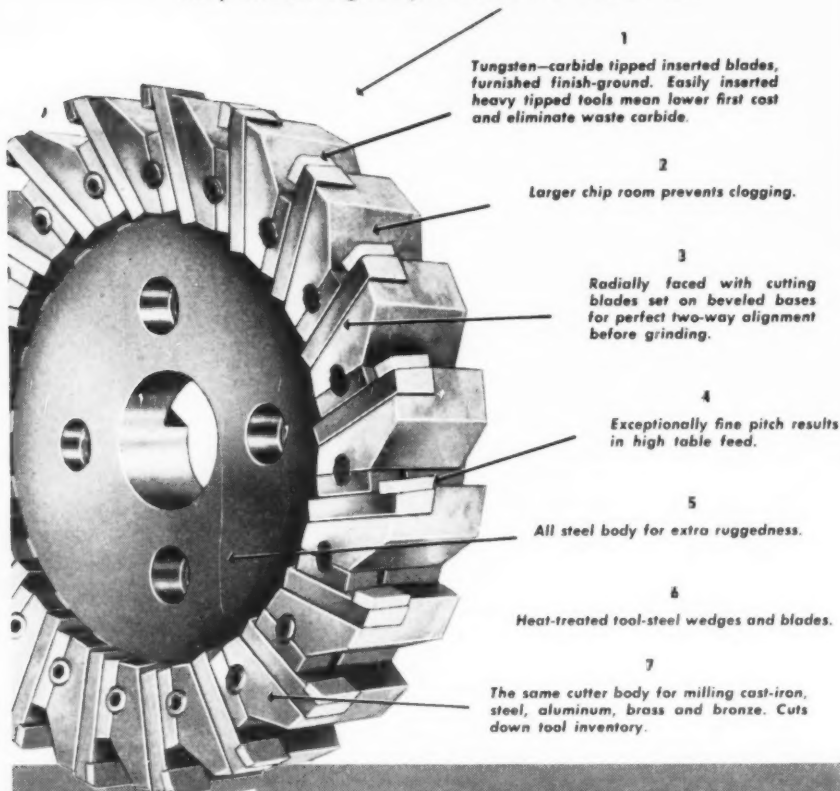
for HIGHER PRODUCTION..lower down-time

HERE'S THE NEW (Series 1B)

## NELCO Face Mill



... that has all these features. Together  
they mean higher production at lower cost



1  
Tungsten-carbide tipped inserted blades,  
furnished finish-ground. Easily inserted  
heavy tipped tools mean lower first cost  
and eliminate waste carbide.

2  
Larger chip room prevents clogging.

3  
Radially faced with cutting  
blades set on beveled bases  
for perfect two-way alignment  
before grinding.

4  
Exceptionally fine pitch results  
in high table feed.

5  
All steel body for extra ruggedness.

6  
Heat-treated tool-steel wedges and blades.

7  
The same cutter body for milling cast-iron,  
steel, aluminum, brass and bronze. Cuts  
down tool inventory.

Write for the name of your  
nearest Nelco dealer and  
descriptive literature includ-  
ing sizes and prices.

# NELCO TOOL

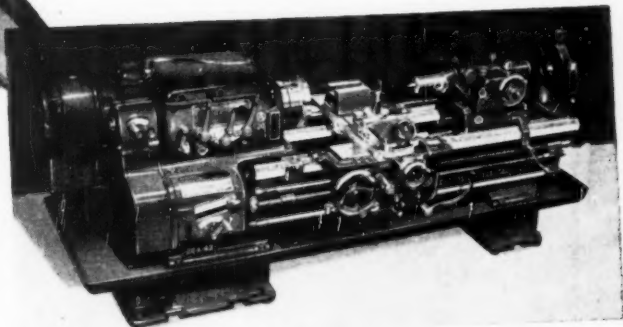
NELCO TOOL CO., INC., Manchester, Conn.



# AXELSON FIRST CHOICE

MANAGEMENT EXECUTIVES AGREE a greater volume of production per man-hour and better quality work at less unit cost are produced in their machine shops on AXELSON heavy-duty engine lathes.

## MASTERPIECE OF PERFECTION



MORE PRODUCTION PER DOLLAR CAPITAL INVESTMENT is assured with AXELSON lathes because of their available speeds...greater ease of operation...ample reserve of smooth power at the cutting tool.

BETTER QUALITY WORK is produced on AXELSON lathes because of their inbuilt precision accuracy...extreme rigidity to maintain positive alignment.

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LONGER LIFE — LESS MAINTENANCE with AXELSON lathes, cut depreciation and plant overhead...provide years of added precision work without usual replacement costs.



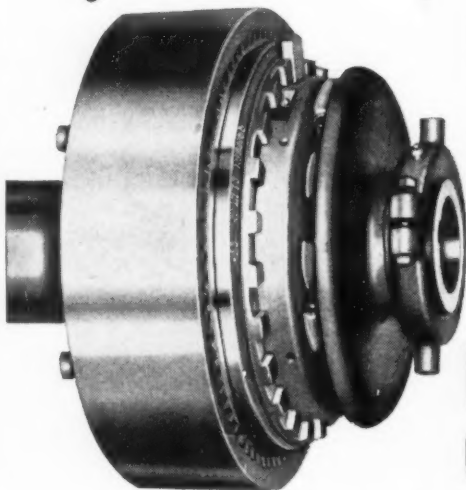
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DEPENDABLE FOR A THIRD OF A CENTURY

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from 1/3 hp to 300 hp;  
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**CLUTCHES**

*for s-m-o-o-t-h flowing power*

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**2745 Colerain Avenue**

**Cincinnati 25, Ohio**



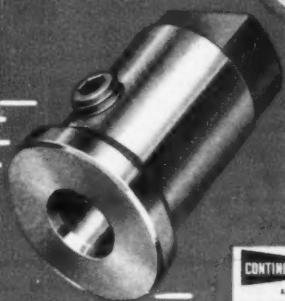
# CONTINENTAL

*Floating*  
**TAP DRIVER**  
*and*  
**HOLDER**



**SIMPLE,  
STURDY,  
NO PINS OR SPRINGS**

You get trouble-free tapping with Continental Tap Drivers. Simply constructed, they are designed for spindles that use standard adjustable adaptors. Radial and axial float compensate for misalignment, allowing tap to center itself. For economical tapping, standardize on Continental Tap Drivers. Write for your free copy of Bulletin No. 60781.

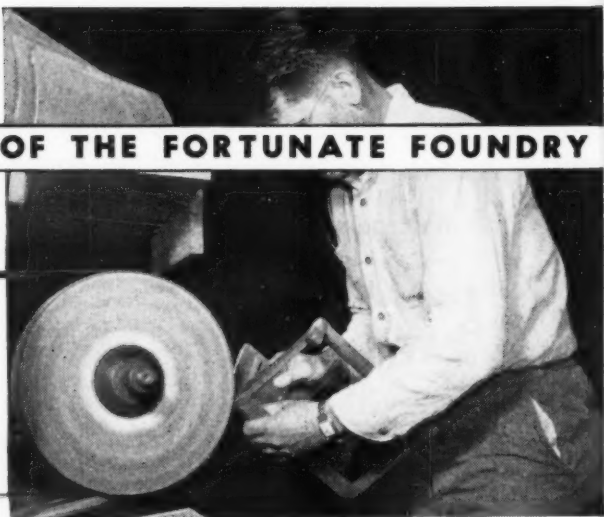


49-2

**CONTINENTAL TOOL WORKS**  
DIVISION OF EX-CELL-O CORPORATION  
DETROIT 32, MICHIGAN

## THE CASE OF THE FORTUNATE FOUNDRY

*Finds a  
28% boost  
in finish  
grinding  
air scoop flaps  
with*



## METALITE\* CLOTH BELTS

### GET THE COMPLETE SERIES

Our booklet "Production Talks Back-stands" gives you a whole series of similar case histories with convincing facts and figures. Write for your copy today.



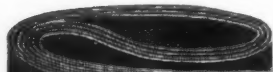
\* Reg. U. S. Pat. Off.

When this shop converted from set-up wheels to the belt backstand method, interruptions in production were cut 'way down, one METALITE Cloth Belt outlasting four set-up wheels, permitting almost constant production, with time-out for belt change only one minute. The operation was finish grinding the outside edges of air scoop flaps — magnesium castings. DURABONDED METALITE Cloth Belts, #50-X grit, 2" x 118", were used over soft contact wheels, 16" x 2" x 1 1/4" rough edge — belt speed, 8500 SFPM. Output jumped to 60 per hour — 28% over the set-up wheel method formerly used, finish was better and costs were cut substantially.

You may find it profitable to check these findings against your production, with a demonstration in your plant of the belt method with METALITE Cloth Belts. Write, wire or 'phone us to arrange it.

**BEHR-MANNING · TROY, N. Y.**

**NORTON** abrasives



**THE BELT METHOD IS THE BETTER METHOD  
... AND THE BETTER BELT IS METALITE**

# SAVE

# on FIXTURE DESIGNING WITH BETTER WORK HOLDING

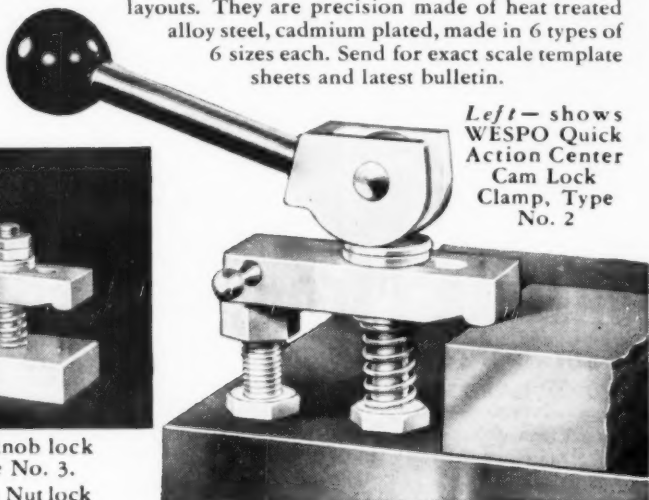
## WESPO

*Improved*

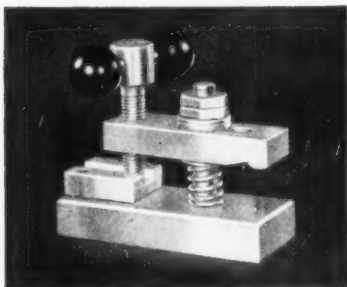
## FIXTURE CLAMPS

WESPO also makes a complete line of over 350 types and sizes of fixture parts and fittings.

WESPO Clamps can be included in your fixture layouts. They are precision made of heat treated alloy steel, cadmium plated, made in 6 types of 6 sizes each. Send for exact scale template sheets and latest bulletin.

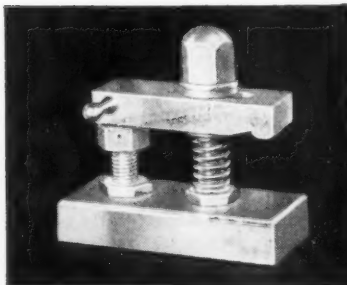


*Left— shows  
WESPO Quick  
Action Center  
Cam Lock  
Clamp, Type  
No. 2*



*Above—End knob lock  
clamp, Type No. 3.*

*Below—Acorn Nut lock  
Type No. 5*



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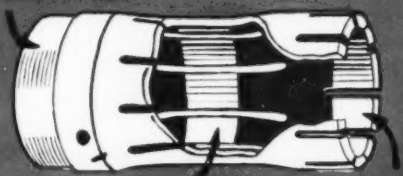
19631 Merriman Court  
FARMINGTON, MICH.



*Shorten those  
bar ends!*

Hardened and  
ground threads

Patent No.  
2341744



Extra midsection  
bearings

Full size  
nose bearings

## SHEFFER "ECONOMY" PUSHERS

**A positive, concentric grip—TO THE END OF THE BAR**

Triple economy here, (1) more good pieces per bar (2) heavy-duty construction for long life (3) fewer adjustments require less down-time. Dual bearings do it—50% to 100% more surface means better grip, less pressure and fatigue.

Threads ground after heat treat assure uniform close fit, trouble-free assembly and maximum tube life.

### OTHER SHEFFER PRODUCTS

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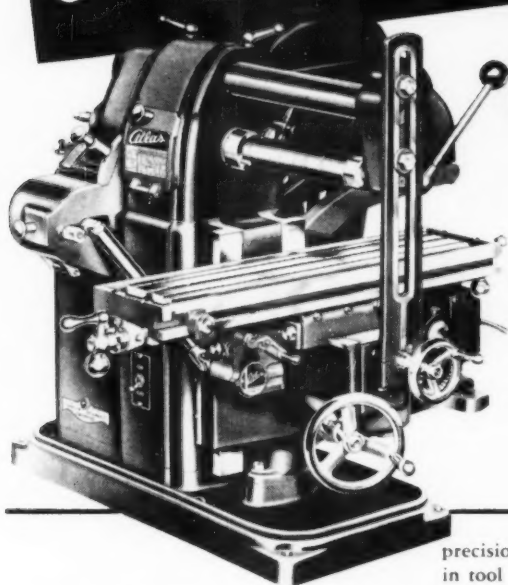
CONCENTRICITY

**Sheffer Collet Co.**

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MICHIGAN

# SLASH MILLING COSTS!



## Atlas MILLING MACHINE

- ★ Timken bearings
- ★ Backgeared power
- ★ V-belt drive
- ★ 8 spindle speeds
- ★ 4 1/2" x 18" precision-ground table

You can save hundreds of dollars a year with this Atlas miller on the job for small parts milling.

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The Atlas handles the full range of milling from slabbing and facing cuts to end milling, keyways, finishings, and layout work. It is a

precision machine in *every* respect—valuable in tool room or laboratory—ruggedly built for round-the-clock production. Adding air chucks gives you a semi-automatic producer at exceptionally low cost.

Send for new catalog — just off the press — with complete specifications and operating details.

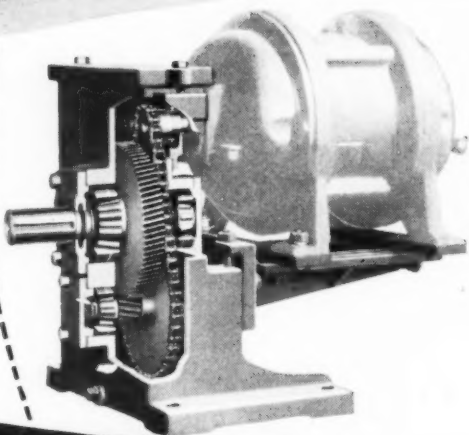
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250 N. PITCHER STREET  
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**MATCHED PRECISION TOOLS FOR  
WOODWORKING AND METALWORKING**

**Wider Production Facilities**



**CULLMAN SPEED REDUCERS**



**Write Today!**—ask for your copy of the useful Cullman Speed 24 page Reducer Book. It is replete with blue prints, photographs and numerous tables of ratings, and prices to promote quick selection and delivery.

The wide range of Cullman speed reducers— $\frac{1}{4}$  to 15 H.P.—provides the ideal size and type for most requirements. They enable you to achieve far wider production facilities for existing motor equipment.

Cullman drives, single and double reduction, are equipped with roller or ball bearings and sturdy helical gears, all moving mechanism operating in oil. Flange type motors are directly connected to the reduction case.

**CULLMAN WHEEL COMPANY**

**1350 ALTGELD STREET • CHICAGO 14, ILLINOIS**

*For Increased Efficiency*

THE  
**KALAMAZOO**  
*Metal Cutting*  
**BAND SAW**



**SPEED  
ACCURACY  
SIMPLICITY**

Cuts off rods, bars, tubes or odd shapes to lengths faster as cutting is continuous. Precision cutting with minimum waste of metal. Sets up quickly and easily —cuts and stops automatically. Large throat (8" x 16") — handles 95% of all jobs.

A low cost tool that pays for itself in STEPPED UP production. Wet Model (illustrated) for continuous cutting or Dry Model for occasional cutting.

*Ask for Bulletin or see your dealer.*

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**KALAMAZOO 16, MICHIGAN**

Exclusive Export Distributor

**American Steel Export Co., New York City**

# L-W

## SWIVEL BASE MILLING MACHINE VISES

**MASTER \$46.95**

Jaws: 6½" wide, 2" deep.  
Opens 4" with jaws, 5¼" without.  
Wt. complete with crank, boxed, 85 lb.

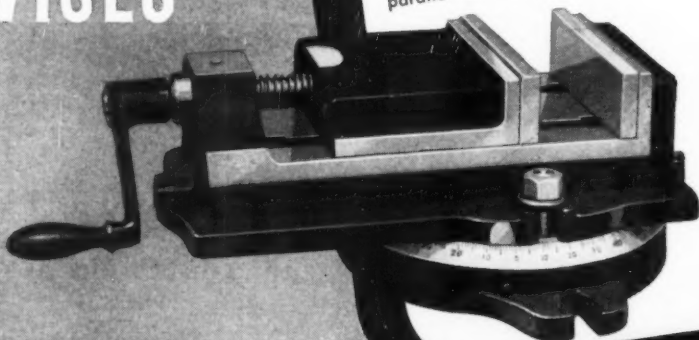
**JUNIOR \$31.45**

Jaws: 4½" wide, 1¾" deep.  
Opens 3" with jaws, 3½" without.  
Wt. complete with crank, boxed, 35 lb.

**HUSKY 3" \$18.80**

Jaws: 3" wide, 1" deep.  
Opens 2" with jaws.  
Wt. complete with crank, 16 lb.

★  
**STEEL JAWS**  
Suited to drill press and shaper work.  
**GRADUATED BASE**  
Can be used plain or swivel.  
**LARGE ACME STEEL SCREW**  
Contributes sturdiness and durability.  
**FOUR BOLT AND KEY SLOTS**  
are provided for rigidly attaching to machine table so that work holding surfaces are at true right angles or parallel to table.



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



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MILLING MACHINE VISES

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*Top Performance Consistently Duplicated*

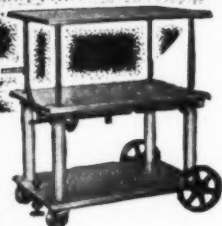
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105



**"BUY"  
A HELPER  
FOR EACH MACHINE**

Style "A"  
Portelvator  
★  
Capacity  
2,000 Pounds



## INSTALL PORTELVATOR

*Hamilton Portable Elevating Table*

## AND CUT PRODUCTION COSTS

**Stop idle machine time!** When weight must be moved, send *one* man, and Portelvator.

Raises, lowers, transports, levels and supports overhanging work. Forms a work bench when and where you need it. May be worked at from all sides. One man can safely lift and carry loads usually requiring the combined strength of four.

Three table surfaces. Four point support. Fast lift and slow lift mechanism. Self locking at any height. *Will not tip or slip.* Positive floor lock.

Standard model capacities 1,000 to 5,000 pounds. Special models designed and built on order. Write for Bulletin P-47.



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**TOOL COMPANY**

SUPER SENSITIVE DRILLING MACHINES  
TAPPING MACHINES - PORTELVATORS

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# Featured in this issue . . . . .

**HYDRAULIC CLAMPING AMONG MANY  
INGENIOUS TOOLING DEVICES AT  
LINK-BELT PLANT**, by Gerald Eldridge  
Stedman. Few editorial writers cover the  
country as well as does Gerry Stedman. His  
articles, which have been appearing in the  
**BLUE BOOK** for years, are a keen analysis  
of industrial procedure the country over. In  
his article this month he visits the Nicetown  
plant of the Link-Belt Company. Page...111

**FUNDAMENTAL PRINCIPLES OF DRAW-  
ING DIES**, by C. W. Hinman. This is the first  
of a number of articles on drawing dies by  
this noted authority. Mr. Hinman's material  
has appeared before in these pages where they  
have been outstanding for their practicality  
and their down-to-earth treatment. Mr. Hin-  
man, no idle theorist, discusses, in this issue,  
the size of drawing radii, drawing without a  
blankholder, drawing concave and tapered  
shells, how to design drawing dies, stresses  
in drawing metals. Page .....121

**ANALYZING THE CAUSE OF FAILURES  
IN WELDMENTS**, Gerald von Stroh. One of  
the important things to know about design-  
ing weldments is, how will the weldment  
perform under service conditions? How can  
the failure of weldments under service con-  
ditions be avoided? In this article Mr. Von  
Stroh analyzes a number of weldment failures  
and discusses the design aspects, as well as  
the welding and material aspects of the  
situation in relation to the failure. Page.135

**MONTHLY MACHINE TOOL SHIPMENTS**.  
Page .....157

**CENTERLESS GRINDING WITH A  
CAMMED REGULATING WHEEL**. This  
centerless grinding development found many  
applications during the war and is being  
applied to modern practices. Many advantages  
are claimed for this method: consistent ac-  
curacy, maximum production, reduction in  
wheel wear, it is unnecessary to accelerate or  
decelerate a mass of slides and wheel housing.  
Page .....162

**BROACHING CYLINDER HEADS WITH  
SINGLE POINT CARBIDE TIPPED TOOLS**.  
An interesting use of carbides, as well as  
broaching, is the operation of broaching four  
sides of a grey cast iron cylinder at the plant  
of one of our motor manufacturers. Besides  
a description of the process, the method of  
maintaining the broach is discussed. Page.169

**LETTER FROM LONDON**. Page .....175

**THE ECONOMICS OF INSTALLATION**,  
part 10 of the NMTBA Sales Refresher Course.  
Mr. Hebert, who as sales manager of the  
Jones & Lamson Machine Co., knows where-  
of he speaks points out the catastrophe which  
awaits American industry unless tools are kept  
up to date. Obsolete machinery will lead to  
economic stagnation; only modern equipment  
will help American progress and prosper.  
Page .....181

**WHAT SHOULD THE SALES ENGINEER  
KNOW ABOUT ANY PARTICULAR PROS-  
PECT**, part 11 of the NMTBA Sales Re-  
freshers Course. Mr. Giebel stresses the im-  
portance of getting facts about the prospect,  
his business, his plans, his markets and any  
other aspect of his business which will help  
the salesman do a real selling job. Page ..197

**AVAILABLE LITERATURE**. Page .....205

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**APPOINTMENTS AND PROMOTIONS**.  
Page .....226

**WHAT'S NEW IN METALWORKING**.  
Page .....237

**CARBIDE DIES**, Latest developments in this  
field of carbide application is discussed in  
practical, workmanlike manner. Page ...328

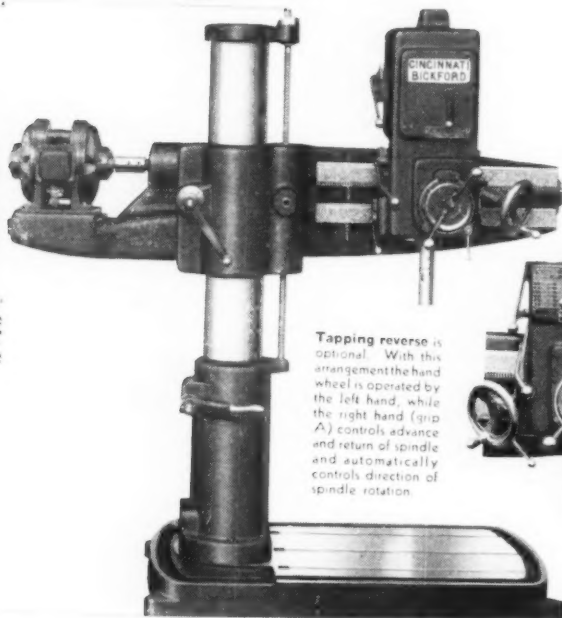
**MECHANICS THROUGHT THE AGES**.  
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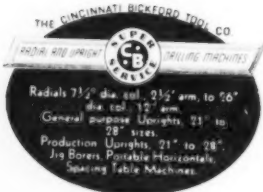
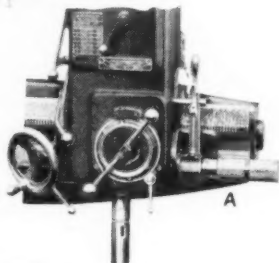
**INDEX TO ADVERTISERS**. Page .....350

**SMALL MACHINE...**

**big Production-**



Tapping reverse is optional. With this arrangement the hand wheel is operated by the left hand, while the right hand (grip A) controls advance and return of spindle and automatically controls direction of spindle rotation.



Equal Efficiency of Every Unit  
Makes the Balanced Machine

Basic features that lower costs in the field of small, high-speed drilling and tapping are found in the 2½' arm simplified design Cincinnati Super Service Radial.

High speeds (to suit your job). Low investment (through simplified design and a completely jigged production setup).

Power saving (one horse power motor), saving in floor space, and speedy operator handling through convenient finger touch controls.

These small machines are accurate and sturdy, and are built to steadily produce at low costs.

Write for Bulletin R-26-A for details of the many new features found in these machines.

**THE CINCINNATI BICKFORD TOOL CO.** Cincinnati 9, Ohio U.S.A.

# *As the* ..... **editor** **SEES IT . . . . .**

## THE HIGH COST OF OBSOLETE MACHINERY

The amazing improvements made in metalworking equipment in the last two decades is equalled only by the phenomenal production increases and lowered costs reaped by the progressive manufacturers who installed these mechanical geni on the production line. Some of our more respected shops would not merit anybody's applause for high caliber work had they not engaged the help of better machines. Yet, when confronted with the visible result of cost dollars saved and production hours gained, to say naught of manpower conserved, it is wondrous to note, on the other hand, the dexterity with which some shops sidestep modern machines and techniques. Such agility in dodging the benefits of new ideas and time saving production equipment belongs on the football field and not in a 1949 manufacturing plant.

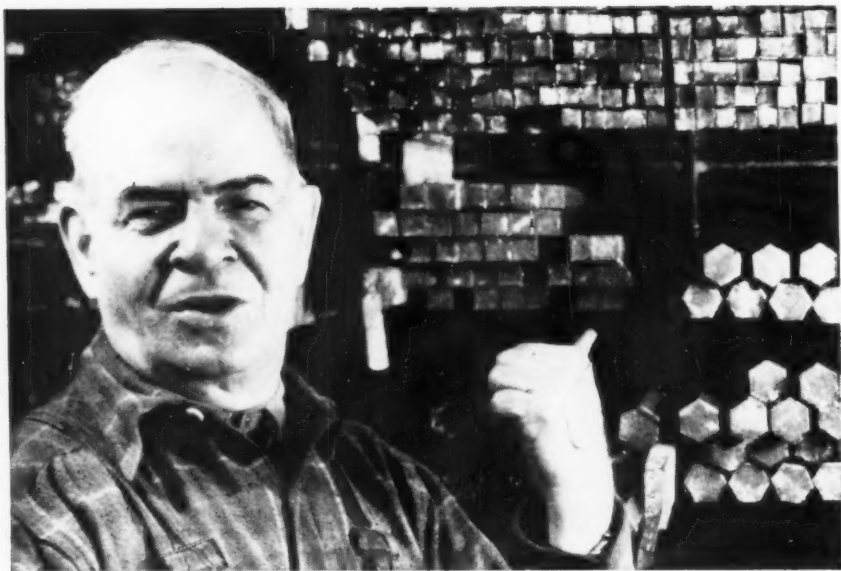
The writer recently concluded several sorties into eastern, southern and middle western shops where he witnessed the intelligent use of streamlined mechanized equipment as well as stumbled over and gazed spellbound at ancient American museum pieces. One shop harnessed the expensive manpower of fourteen girls to perform deburring operations, using elbow grease and files . . . a small speed lathe with one operator would have been the answer. A manufacturing executive cried over the high cost

of doing business; yet all his equipment was powered by overhead drives which wrestled with slow and bearded grandads of the good old days. In another shop, four men, arranged in a row like toy soldiers, performed a drilling operation on a casting. The first operator drilled one hole, passed the casting to the next who drilled the second hole, then passed the casting to the third and fourth for two more drilling operations. When asked about the advisability of installing a multiple drill press, which would drill all four holes simultaneously, the works manager shrugged his shoulders . . . "these things cost money."

With the whirlwind advances made in carbides, moss-back conceptions of speeds, feeds and work-holding devices have been carefully labeled and tucked away by modern shops as the relics of a dead era. Yet in shop after shop carbides were shunned like rare 5-legged zoological specimens having no business in a machine shop. Another plant surfaced small aluminum gear housings in a milling machine when a wet belt surfacer could have upped their production tremendously.

If the coming competition accomplishes little else but jar some metalworking executives into cognizance of the necessity of installing modern production machinery, the battle will be won.

*William F. Schleicher*



## Sure, We've Got Steel, But . . .

Sure, we've got steel—tons of it. Many kinds and shapes, thousands of sizes.

But we've got trouble, too—and plenty of it! We haven't got enough of the particular kinds of steel that everybody seems to want. That's simply because more people want more steel these days than ever before.

We certainly wish there was more we could do about it. We can offer you many steel products such as stainless, alloys, mechanical tubing . . . ready to ship right now, though all sizes are not always available. And when we can't ship exactly what you want, we'll do our best to find something that will work out just as well.

*On the hard-to-get items we may have to ask you to call again. But remember, our stocks turn over quickly. Kinds and sizes gone today may be here tomorrow. So, next time you need steel from stock, check your nearest Ryerson plant.*

### Principal Products

**BARS**—Carbon & alloy, hot rolled & cold finished

**STRUCTURALS**—Channels, angles, beams, etc.

**TUBING**—Seamless & welded mechanical & boiler tubes

**STAINLESS**—Allegheny metal plates, sheets, bars, etc.

**PLATES**—Sheared & U. M., Inland 4-Way Floor Plate

**SHEETS**—Hot & cold rolled, many types & coatings

**MACHINERY & TOOLS**—For metal working

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco

# RYERSON STEEL

## HYDRAULIC CLAMPING AMONG MANY INGENUOUS *Tooling Devices at Link-Belt Plant*



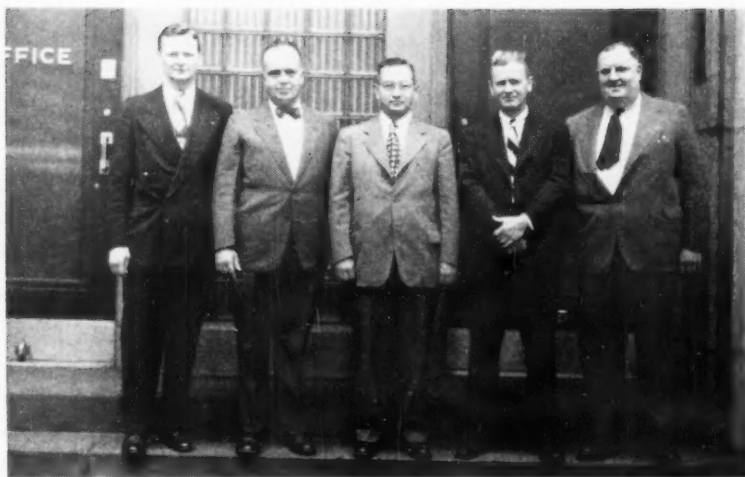
by Gerald Eldridge Stedman

Special purpose machine tools, hydraulic clamping devices, multiple machining, and ingenious tooling are found in Link-Belt's Nicetown plant. Of special interest is the milling of teeth in a reducer wheel flange face. The operation involves a flute, taper, and radial cut. The set-up is described by the author.

THE NICETOWN-Philadelphia plant of the Link-Belt Co. maintains payroll of 975 shop men with an average turnover of less than 1 per cent. Absenteeism runs from 1.5 to 1.9. Supervisional ratio is one to 30. Nicetown ranks second among company plants in accident frequency rates, being 9.5 per 1,000,000 man-hours. For the first three months of 1948, the frequency rate stood at 3.8.

Nicetown manufacturers speed reducers and PIV (Positive-Infinately-Variable) speed controls, roller and silent chain drives, various power transmissions and materials handling equipment. In addition, some of its energies are preoccupied with custom-built items, being manufacturing source on the Eastern seaboard for specially engineered equipment, such as conveyors, coal and log handling apparatus. A considerable part of its shop area is given over to this job lot work.

The plant has been almost completely revamped since 1945 with re-layout of floors, machine replacement, improved flow in which all elements of stock, store, tool and machining areas have been heshuffled to achieve greater production at lower cost. Resultant efficiency is



Executives of Link-Belt's Nicetown plant. Left to right: R. W. Suman, chief engineer, power transmission; J. M. Oakes, sales manager, enclosed drives; R. B. Holmes, general manager; D. H. Renfrew, general superintendent; L. S. Paulsen, superintendent of machine shops and tool engineering.

reflected in pounds shipped in this progression: 1944, 19 million; 1945, 21 million; 1946, 22 million; 1947, 29 million.

The Nicetown plant is a beehive of advanced production ideas which have increased production, reduced overall processing costs. Special purpose machine tools, multiple machining, employment of supplementary hydraulic

controls (operating at 2000 p.s.i.), automatic feed and retract, simplified set-ups that minimize downtime, electronic cycling, small lot production control that opens the line to a variety of types and differing ratios, precision locating centers, unusual spindle speeds, retooling savings, elimination of repositioning, use of oscillating holding fixtures are examples of advanced shop practice.

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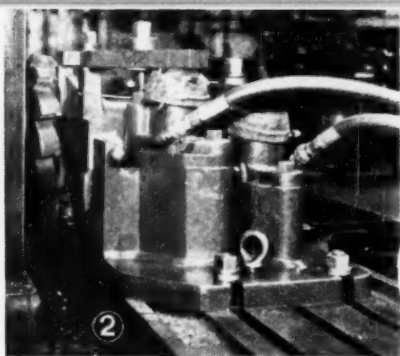
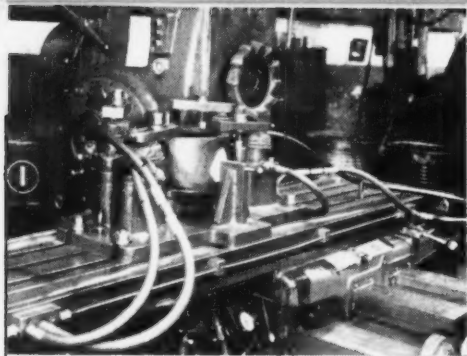
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Figures 1 and 2 show a Kearney & Trecker No. 50 CSM milling machine with special hydraulic clamping fixtures to accommodate varied sizes with minimum load and downtime. Rough and finish cuts are taken, the work coming away at 65 micro/inch. Rough cut is at 42"/min., finish at 21/min. The hydraulic clamping arrangement uses 2000 p.s.i. Dial gages are used for precision positioning, most Link-Belt machine tools have such indicators set up on locating blocks of the tooling fixtures. This facing cut is by carbide mills around 425 f.p.m., work being located from center pin and pads in the hydraulic fixture.

Figure 3. Boring and facing of the large bore on the worm housing, involving 8½" dia. is on a special W. F. and John Barnes boring machine with special hydraulic clamping fixtures and rapid positioning pointers. There is a similar dial dimension control of centers and heights. A dual opposed head is used carrying four tools:

1, rougher; 2, semi-finisher; 3, micro-adjusted finisher; 4, chamfering tool. Performance is simultaneous. The machine head is stopped and in the dwell the feed-out facing is thrown into gear. Both faces are finished at the same time. The set is at 300 s.f.p.m., tools are carbide. Dial gages check bore, face, centers and heights at machine operation.

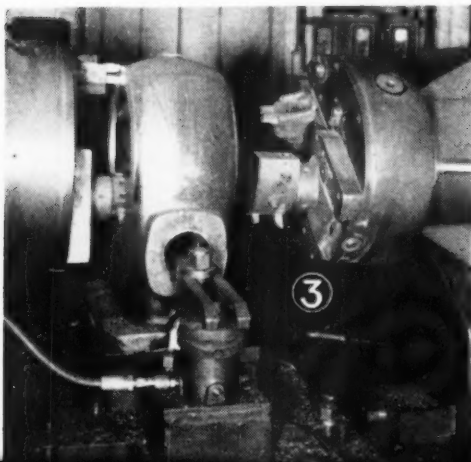
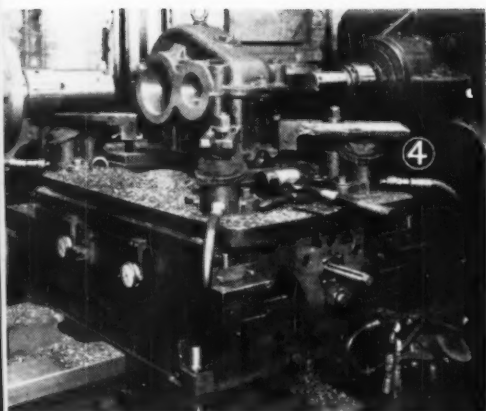


Figure 4. Small bores on both housing sides are completed in a similar special boring set-up with the spindle carrying a quick-change holder carrying rough, semi-finish, bore c'bore and bump facing tools which perform in one operation, work held against finished face and bore, facilitated by swift-acting hydraulic clamps. High pressure



clamping is by separate system. Multiple tool holding with quick-change adapter and dial indicator mechanism to check positive stops involves principles of tool design and dimensional control that have wide application. The cost reduction and production increases made possible by this set-up are revolutionary.

Figure 5. A new automatic drilling set-up involves a hydraulically actuated table in connection with a Natco 42 spindle multi-drill which carries a trunion drilling jig on a 12' bed. This allows four sides of a casting to be drilled at varied bolt centers along three stations set in sequence, work being stopped automatically. The installation employs easy loading fixtures for multiple operations.

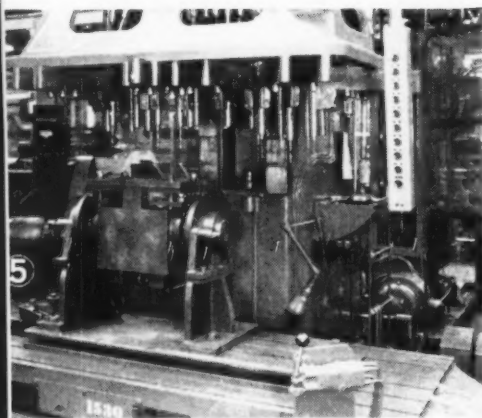
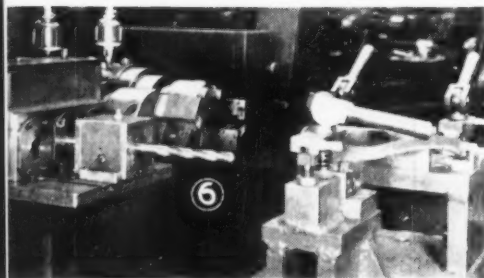
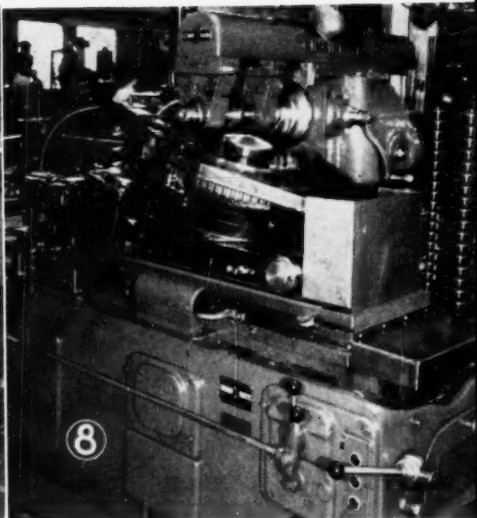
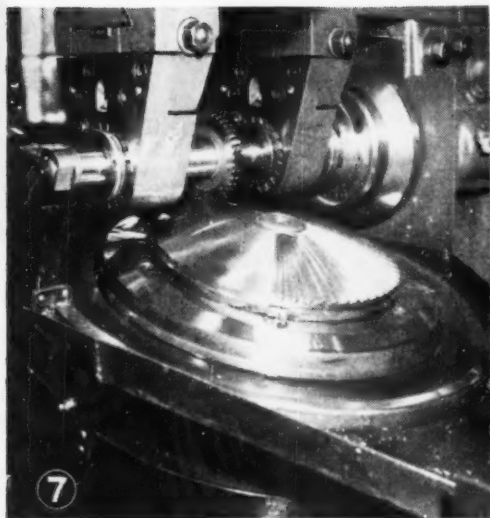


Figure 6 illustrates the machining of heads for the PIV shoe bracket. This bracket is a rather complicated casting, first straightened on a special locator jig. It is then turned, faced, chamfered and an end hole drilled simultaneously on a Milwaukee Stoker-unit, cam actuated, using four heads, two to rough and two to finish cut. This set-up uses PIV gear reducers, employs 1350 rpm. on drills, 1700 rpm on heads. Drills are horizontal. Holding is by mechanical cam clamps. The work was formerly accomplished on an engine lathe and drill press. Changeover to multiple machining has brought costs down 60 per cent on this operation.





Figures 7 and 8 show an intricate machine tool set-up which mills the teeth in a PIV reducer wheel flange face. This work is done on a Cincinnati Hydromatic No. 4 with a special Link-Belt-designed head that employs an oscillation movement to get the proper tooth whip in the intricate radial and contour design of this flange face. The operation involves a flute, taper and radial cut. The Link-Belt fixture is hydraulically actuated, employs an automatic feed-retract cycle, uses high speed tooling, carbide cutters having involved too much breakage because of the oscillation. The operation involves 60 indexes and has solenoid controlled hydraulic action. The metal is Niroloy. The problem was to synchronize the oscillation with proper speed and feed. This was accomplished by Link-Belt PIV reducer application.

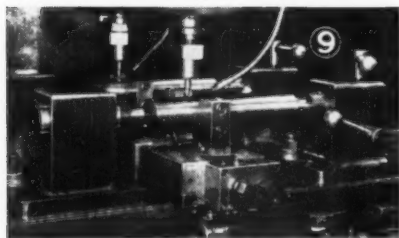
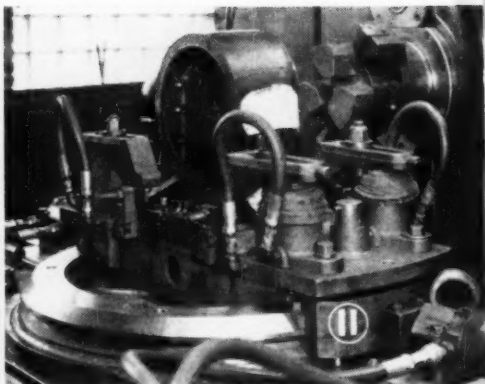
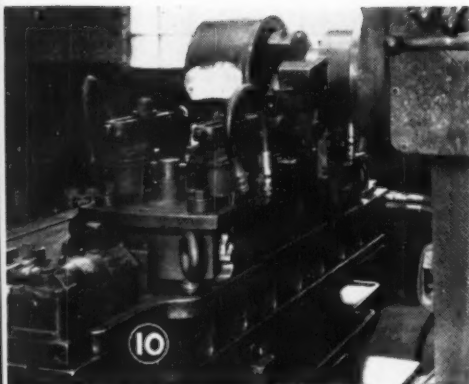
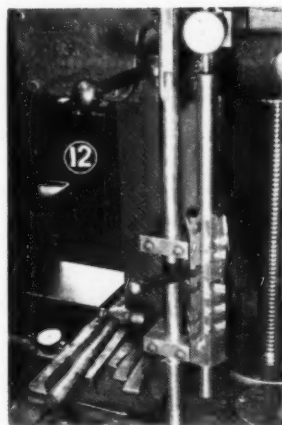


Figure 9 shows the milling of reducer shaft keyways. Two keyways are milled at a time with a double head on a Kearney & Trecker Milwaukee No. 4. A spindle speed of 2600 rpm is used. Both spindles operate concurrently.



Figures 10, 11 and 12. This is another unique Nicetown special machine rigging that has materially increased production through the application of indicating mechanism and single purpose tooling to a G. & L. horizontal mill. This uses a motorized reducer. The multi-tooled cutting head rough cuts, semi finishes, finish bores, c'bores and faces, using a hydraulically actuated trunnion fixture which rotates to work both sides. The hydraulically clamped positioning mechanism achieves precision locating by dial indication, and the trunnion actuation makes possible fast face-to-face production. Figure 11 shows rotating section on fixture for indexing 180°.



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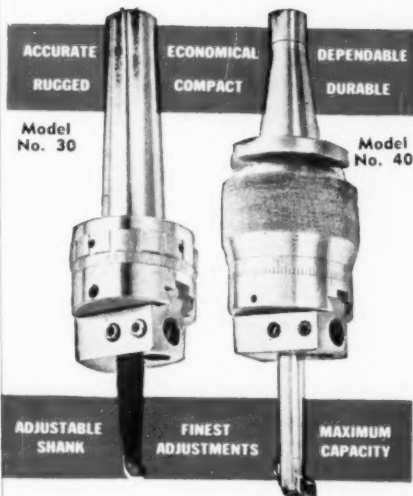
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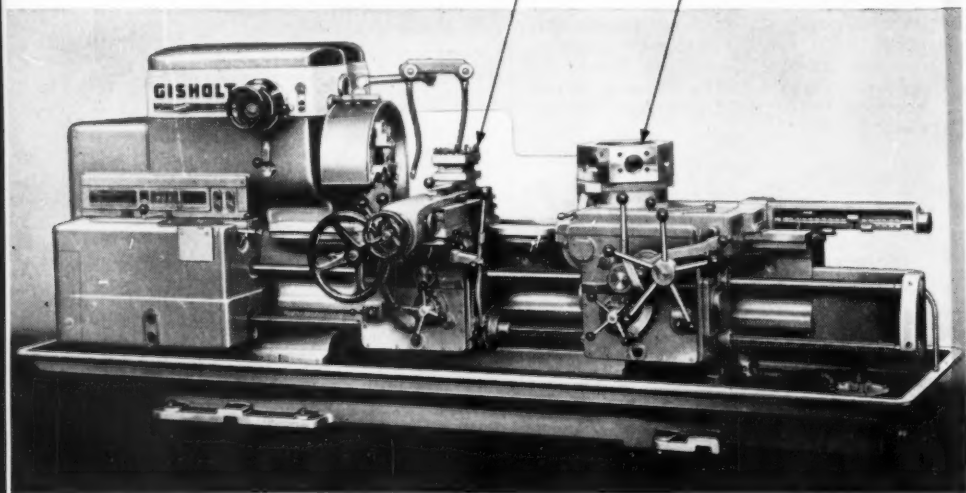
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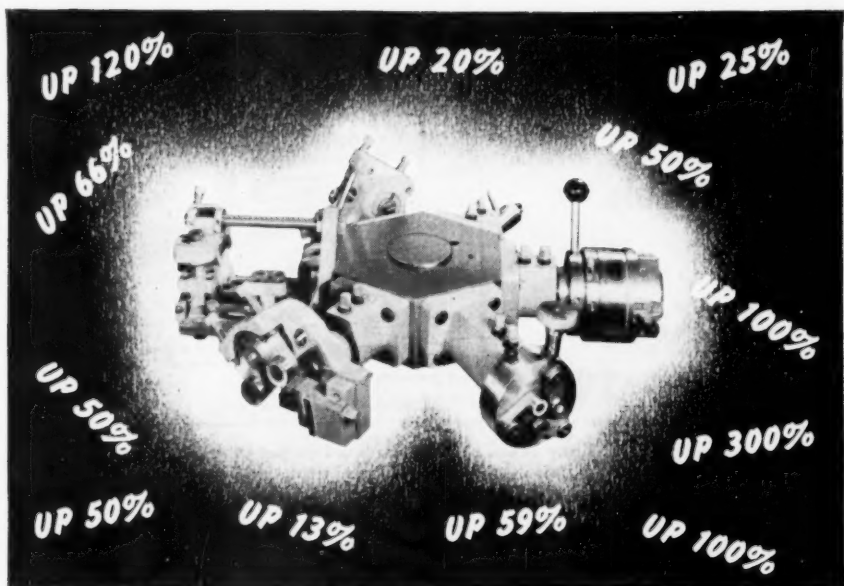
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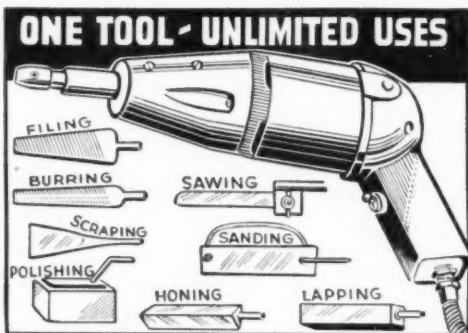
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## FUNDAMENTAL PRINCIPLES *of Drawing Dies*



by C. W. Hinman, Designing Engineer

This is the first of a series of articles dealing with drawing dies. Other articles on this series will appear in future issues of the **MACHINE** and **TOOL BLUE BOOK**. Discussed in the present article are: the size of drawing radii, drawing without a blankholder, drawing concave and tapered shells, how to design drawing dies, stresses in drawing metals.

**T**HE FIRST step in producing a drawn shell is illustrated in the sectional views at A and B, Fig. 1. At A, the blankholder descends ahead of the punch, and holds the blank taut on the die face, while the drawing punch continues to descend and "cup draws" the blank down into the die. At B the shell is shown half finished. An air-vent hole through the punch is necessary to prevent vacuum resistance when "stripping" the finished shell from the punch.

In single-action presses, blankholder pressure *P* is produced by compression springs, by soft rubber, or hydraulically in some very large presses. A hydraulic blankholder increases the holding efficiency greatly. Hydraulic pressures are constant throughout the operation, but compression springs or rubber will increase and/or decrease in holding power relative to the travel of the punch. A hydraulic blankholder permits deeper and better draws; they also have an easier action on the press mechanism.

Double-action presses have two rams in which an outer ram surrounds the inner punch. The blankholder is attached on the face of the outer ram. The

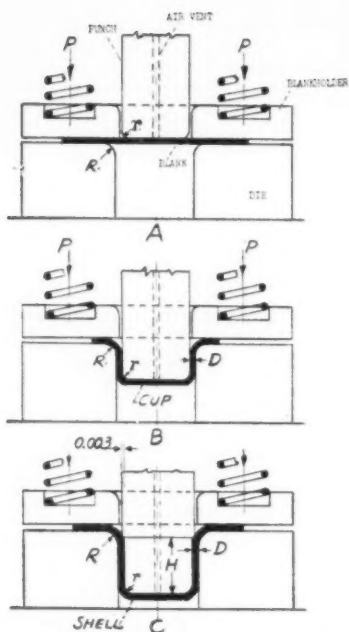


Fig. 1. Illustrating the fundamental principles governing the drawing of shells from sheet metal blanks.

blankholder descends ahead of the punch, and holds the blank down while the drawing punch descends through it and draws the blank down into the die and forms a cup or shell. Thus, double-action presses eliminate the use of springs, soft rubber, or hydraulic pressure to activate the blankholder.

The unilateral drawing clearance  $D$  is made equal to the work material thickness; it is a uniform space that extends all around between the punch and die opening. Sometimes, this space is made a few thousandths of an inch less than the material thickness for "ironing" the shell wall thinner.

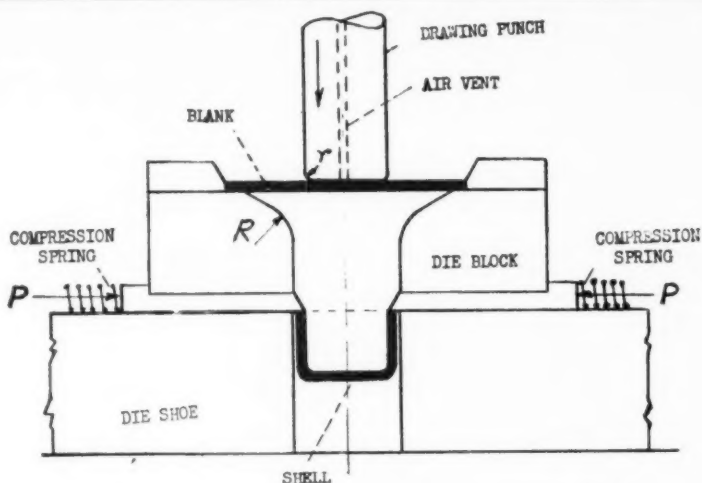
At  $C$  is a case in which the general rule—the depth of draw must not exceed the shell diameter—can be easily

evaded. A sharp shoulder 0.003 in. deep is provided around the drawing punch at height  $H$  from the nose on the punch, which is safely under the shell diameter and the prescribed rule. In this design the shoulder on the punch, in descent, will "bite" into the shell wall, thus relieving drawing tension on the shell and prevent fracturing it. This is a safe and sure method for drawing deep shells without fractured corners. The drawing punch will not rupture the shell bottom.

### What Size Drawing Radii?

For sheet-steel thicknesses under No. 14 U. S. gauge (0.078 in.), sizes of radii over the entering edge of the drawing die are governing factors. If these radii are too small, the work will rupture near the face edge of the punch or when drawn over the die radius. Such ruptures are caused by excessive friction generated by pulling the metal from under the blankholder and then over an insufficient size of radius. On the other hand, if these radii are excessively large, thin metals will wrinkle when passing over the arc entering the die. Obviously, there is an ideal size of drawing radius that lies between these two extremes.

Although there is a fairly definite relationship between the material thickness and drawing radius  $R$ , nevertheless the radius should be varied for large blanks and different tempers of metals. However, for drawing mild steels the following sizes for  $R$  have been established. For 1/64-in. stock, use 1/16-in.  $R$ . For 1/32-in. stock, use 1/8-in.  $R$ . For 3/64-in. stock, use 3/16-in.  $R$ . For 1/16-in. stock, use 1/4 in.  $R$ . For 5/64-in. stock, use 3/8-in.  $R$ . For 3/32-in. stock, use 7/16-in.  $R$ . For 1/8-in. stock, use 9/16 in.  $R$ . If  $R$  exceeds these figures too much, the blankholder tension cannot be adjusted to prevent wrinkles in the shells. Wrinkles once started cannot be removed; they will



**Fig. 2.** This die draws heavy gauge shells without a blankholder. Slides P-P strips the shell from the punch when it ascends. The stripping device is optional.

still show after several anneals and redraws.

If radius  $r$  on the face edge of the drawing punch is equal to or greater than  $R$ , so much the better. Radius  $r$  should be as large as possible, especially in shells that are to be redrawn. Of course much depends on the kind of work material used and most of all on its deep-drawing qualities. Sheet-steel thicknesses above No. 14 U. S. gauge (0.078 in.) can usually be drawn without wrinkling, even without a blankholder.

### Drawing Without a Blankholder

Heavy-gauge metals can be successfully drawn through a die without the usual blankholder pressure. Light-gauge nonferrous metals are similarly drawn when the shell diameter is small relative to wall thickness. Fig. 2 represents the usual design of the die. Radius  $R$  is made approximately five or

six times the blank thickness to provide an easy draw into the die. Three or four equally spaced stripper slides, actuated by compression springs  $P$ , are forced to withdraw when the drawn shell passes between them, and to close together after the shell passes. By this ejecting device the work is stripped from the punch in ascent.

The shell diameter should not exceed about twenty times the blank thickness; otherwise wrinkles may appear in the drawn shell. This principle is well known by manufacturers of cartridges and ammunition shells, and for work in which the shell wall must be "ironed" thinner than the bottom in subsequent annealings and redrawings. The principle is that an extra-thick blank will be stiff enough to overcome wrinkling when the punch descends and forces the metal into plastic flow. In other words: the blank is too thick to wrinkle.

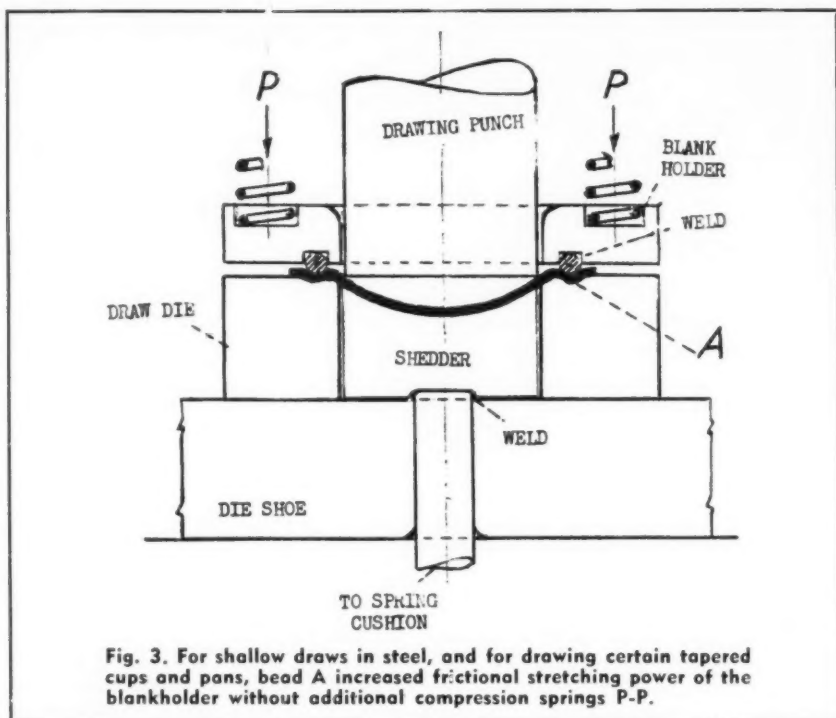


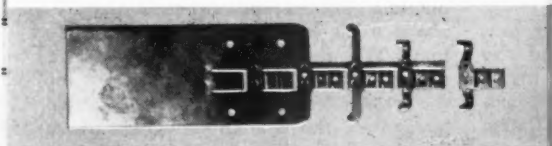
Fig. 3. For shallow draws in steel, and for drawing certain tapered cups and pans, bead A increased frictional stretching power of the blankholder without additional compression springs P-P.

The usual specification for deep-drawing steel is S. A. E. 1010. The first 10 signifies an unalloyed carbon steel of high ductility, and the last 10 indicates a "10-point" carbon content. In the nonferrous metals, copper draws best; and in the brasses, admiralty metal and cartridge brass. Commercially pure aluminum (2S) is considered best for drawing, spinning, and forging. Using this metal in its annealed temper, redrawn shells that may require several successive operations can be made without the necessity of intermediate annealings. Since alloyed aluminum is less ductile than the pure metal, it requires larger radii for bends and is used for less severe drawing depths than the pure metal.

### Drawing Concave and Tapered Shells

In certain shallow-drawing operations, where it becomes necessary to increase the tendency of the blankholder to stretch the metal more taut, bead A is provided around the die opening as seen in Fig. 3. This design is sometimes necessary when drawing certain shallow tapered shells. With no additional spring pressure P, on the blankholder its holding and stretching power is thereby increased enormously. The tension power of the blankholder can be controlled by the shape, size, and depth of the bead. This design is usually not resorted to unless the work material is steel. It will prevent wrinkles in steel that sel-

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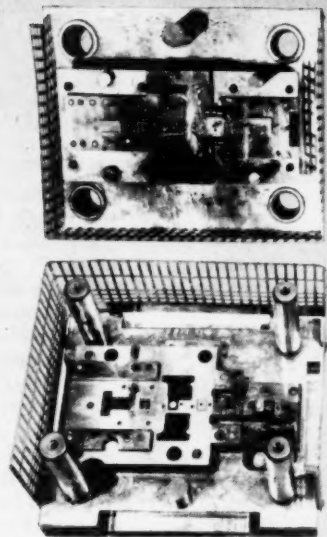
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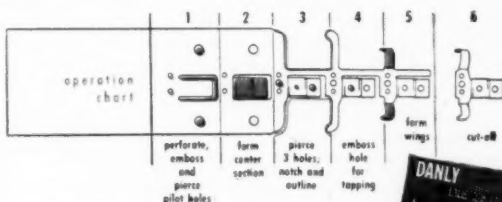
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dom occur when drawing the more ductile nonferrous metals.

### How to Design Drawing Dies

The first thing to remember is that the shell hugs the punch and the size of the punch determines the inside dimensions of the shell. As the punch descends and the area of the flange held under the blankholder decreases, the shell will hug the punch less tightly at the end of the draw. Where the metal flows over radius  $R$  at the entrance to the die, it is not held at all. Depending upon several factors, this metal may remain smooth, but a microscopic examination will show that short wrinkles have been ironed out under the blankholder pad. Being under no drawing tension, this part does not hug the punch so tightly. Furthermore, the top is usually thicker than the rest of the shell wall, because it has not been under high drawing tension.

This characteristic of the shell to hug the punch causes trouble in stripping it from the punch, and is a secondary cause of many accidents. The operator may be running a double-action press continuously, and the finished shells will drop through the press regularly. But a shell may fail to strip off, and at the next stroke the press attempts to draw two shells at the same time in the same die.

This trouble has led to designing many types of dependable strippers; some of them are freakish or peculiar; some are good. Ordinarily it is not necessary to use a special stripper on metal 1/8 in. or less in thickness. On heavier metal a special stripper is required because the force necessary to strip the shell is greater than the resistance at the top of the shell to shear off against the stripping edge under the die. The need of a stripper is evident here because every shell will come up with the punch.

For thin walled shells, the best method to strip the punch is to provide a

"stripping edge" under the die. The edge should be undercut, as shown in Fig. 4. The inner surface of the die opening should be tapered inward about 0.003 in. on a side, at the bottom. The reason for this is that the mouth of the shell opens slightly from the punch because it was not under tension of the blankholder pad when it entered the die. A stripping device for heavily walled shells was shown in Fig. 2.

Small shells are sometimes stripped by a floating split ring which is substituted in place of the stripping edge. The ring is of tempered spring steel, and the closed diameter of its hole is about 0.010 in. smaller than the outside diameter of the shell. The drawing punch, in descent, forces the finished shell through the ring, and the ring closes above the shell. When the punch ascends, the shell is stripped off by the ring. An air-vent hole should be provided through the punch in all cases. This will prevent vacuum resistance when stripping off the shell.

The first precaution to observe in any drawing die, regardless of the type of stripper, is to provide a safety link above the punch or a key through it that will break or shear off when two shells get under the punch accidentally.\*

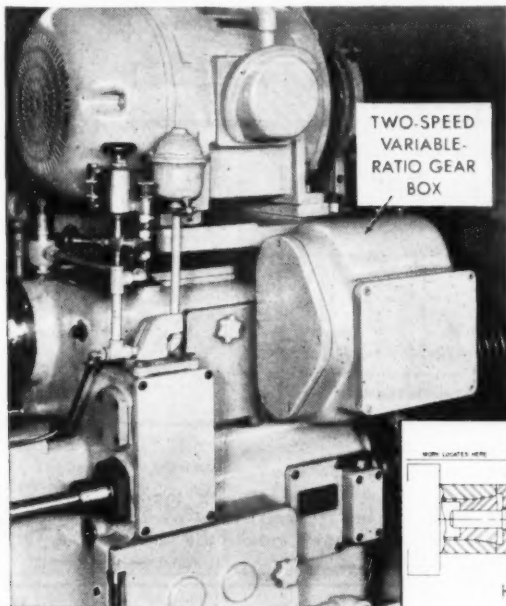
Another thing to bear in mind is that angle  $A$  on the flat surface of the die, under the blankholder (Fig. 5) and the size of the radius leading into the die, control the operations of drawing the shell. When angle  $A$  is too obtuse or radius  $R$  too large, the shell will

---

\*A recent invention is the Dayton Rogers "Overload Pitman" in which a hydraulic valve in the crank-arm opens and takes the thrust if the die is overloaded by two shells or otherwise. This device prevents accidents to the press and dies.

# MACHINE OF THE MONTH

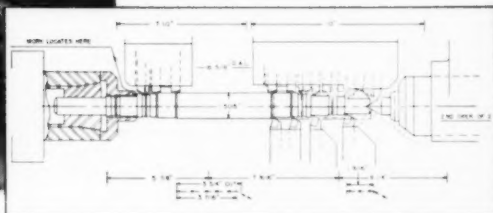
PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



## Combined Turning and Squaring Operations at Different Cutting Speeds Now Possible with Lo-swing Automatically Controlled Two-Speed Headstock

Left: View of two-speed, Variable-Ratio Gear Box with Belt Guards removed.

Below: Tooling layout for electric motor shaft.



**Problem:** To turn, face and undercut shoulders on electric motor shafts, using cemented carbide tools for the turning operations and high speed steel tools for facing, grooving and chamfering operations which require a very smooth finish. Both operations to be made in one handling with automatic spindle speed change between the turning and squaring operations.

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The tooling layout shows the second of two operations on

a 1½" diameter electric motor shaft. The shaft is held and driven, on a previously turned diameter, in an air-operated collet chuck which grips the shaft well in from the end, exposing only the part to be machined. This method reduces the shaft's effective length and eliminates springing due to the rigid grip of the collet. The work is positively located from a previously finished shoulder, insuring accuracy of shoulder lengths.

The shaft diameters are turned with sintered carbide tools mounted on the front carriage, cutting at a surface speed of 350 ft. per minute. The squaring and forming tools are mounted on the rear slide and operate at a surface speed of 70 ft. per minute, insuring a very high polished surface on the shoulders and formed grooves. This combination assures high production, coupled with smoothly finished shoulders, both of which are very desirable on electric motor shafts.

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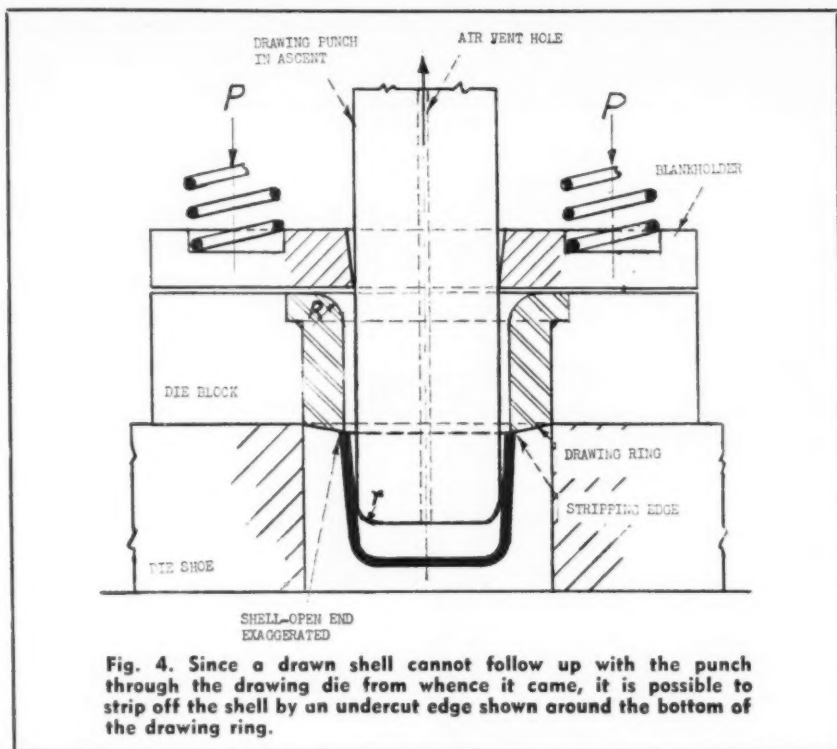


Fig. 4. Since a drawn shell cannot follow up with the punch through the drawing die from whence it came, it is possible to strip off the shell by an undercut edge shown around the bottom of the drawing ring.

wrinkle. When the angle is too acute or the drawing radius too small, the shell will rupture. A single operation shell may be "ironed out" more easily by angle A than by making a tight fit for the work material between the punch and die. The pressure exerted by the blankholder, or pressure plate, is not positive and cannot be controlled accurately; therefore it is best to vary angle A.

For any shell that is to be redrawn, the first drawing operation should not be ironed. The proper method is to draw the first operation shell without wrinkles and leave the ironing until the last operation. By this procedure, the dies will last longer and require

less polishing, and there will be less "down time" for digging out fractured shells.

### What Are the Stresses in Drawing Metals?

In drawing operations the forces are largely compressive. There is extensive plastic flow and a violent rearrangement of the crystals in the metal. To illustrate, take a blank  $4\frac{1}{2}$  in. in diameter, and from it draw a 2-in. diameter cup. First, scribe two parallel lines across the face of the blank, one on each side of the centerline, and  $\frac{1}{2}$  in. apart. See Fig. 6. With the blankholder held tight enough to prevent wrinkling, lower the press ram so that

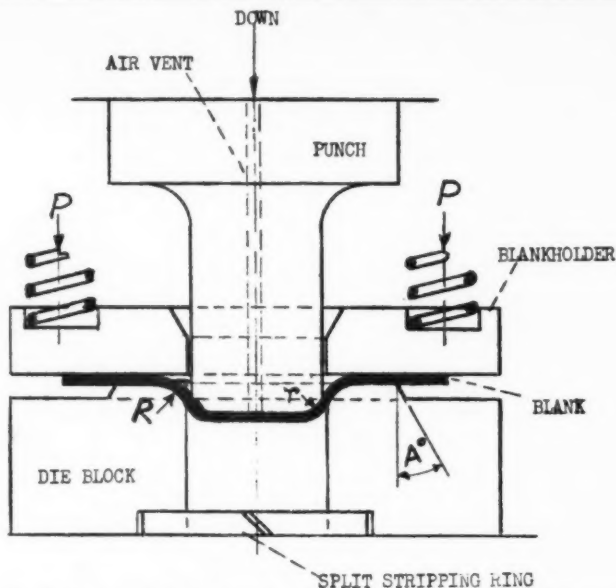


Fig. 5. The spring steel split ring strips drawn shell from punch on its upstroke. Stepped angle  $A$ , on the face of the die block, serves to increase friction on the "slip" of the blank while being drawn down into the die. The holding power of the blankholder is thus increased greatly without adding more compression springs P-P.

the punch descends 1 in. below the top of the drawing die, and the shell is drawn 1 in. deep. Upon removal of the work, the lines will be found still parallel and  $\frac{1}{2}$  in. apart across the bottom of the shell. Thus, no disturbance has occurred in that area. On the vertical walls, the lines converge toward each other and at the top are about  $\frac{3}{8}$  in. apart. On the flange, the lines diverge in opposite directions; they are  $\frac{3}{8}$  in. apart at the shell walls and  $\frac{7}{16}$  in. apart at the outer edge of the flange.

During the drawing operation, stresses are set up in two directions. Those in the vertical walls are tension stresses, caused by the punch when drawing the metal over the edge of the die at

nearly right angles against the resistance of the flange to flow. The stresses in the flange, under the blankholder pad, are necessarily compressive, caused by the violent effort of a larger area of metal to crowd itself into a smaller area without increasing in thickness or wrinkling. This suggests that drawing-punch speeds must be reasonable; the appearance of the first drawn shells usually indicate that a slower punch speed is necessary.

When the shell has been completely drawn, the positions of the scribed lines will be like those in the lower view of Fig. 6. The distance between the lines at the top of the shell is now less than  $\frac{1}{4}$  in., or one-half of the original dis-

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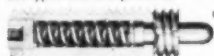
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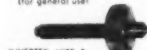
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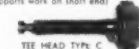
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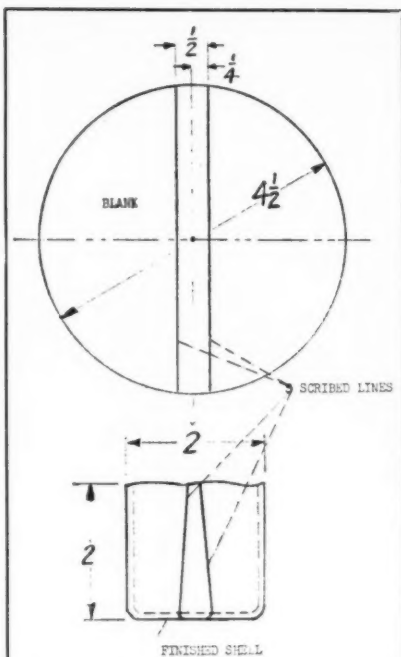


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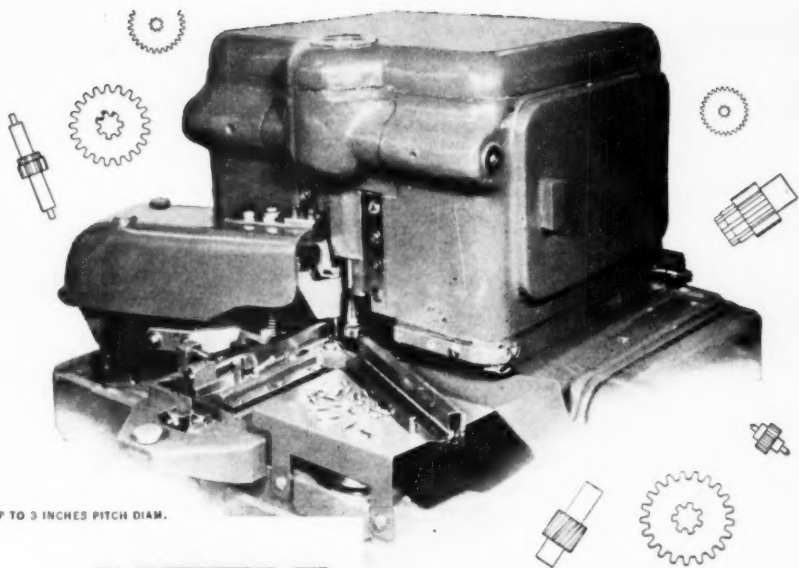
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**Fig. 6. Parallel lines scribed across a blank will be found to converge on the drawn shell walls from the corner of the shell to its top edge. This shows that considerable plastic flow must occur if metal is to be forced into the constricted area between punch and die opening to draw a shell.**

tance. Apparently there should be the same amount of metal around the top of the shell as in the circumference of the blank. But is there? No, because a blank circumference of  $14\frac{1}{8}$  in. has been crowded into one of only  $6\frac{9}{32}$  in. around the top of the shell. Where has the extra metal gone? Part of it has been used to build the walls of the shell higher. It will be found by measurement that the area of a blank  $4\frac{1}{2}$  in. in diameter is the same as the area of a cup 2 in. in diameter by 2 in. deep.



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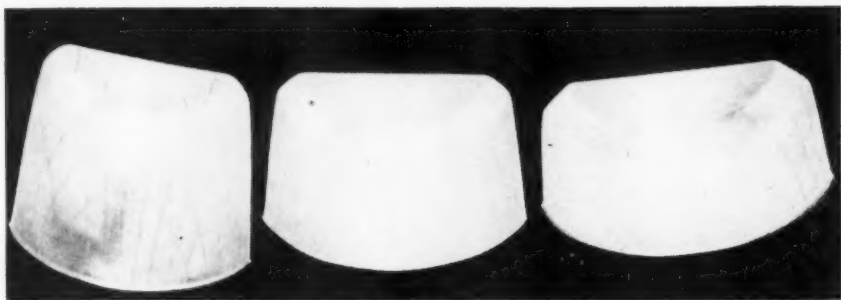


Fig. 7. Equal squares scribed on blanks before drawing, show the flow lines in these drawn aluminum pans. The convergence of lines on the side walls, from the corners to the tops, are especially noticeable.

This presupposes that the metal has not been ironed thinner than its original thickness. This, in turn, depends upon the physical properties of the metal to withstand the necessary stresses without wrinkling or tearing.

It should also be remembered that a metal should never be drawn beyond its elastic limit.

If the 2-x 2 in. shell is of good plastic material, it may be annealed and redrawn to another shell 1½ by 3 in., and next into a 1-by 5-in. shell, and finally to a ½-by 7-in. shell. Shells of these dimensions are made in large quantities for subsequent expanding operations in hydraulic or, more properly, hydrostatic die work.

Figure 7 represents an actual photograph of drawn aluminum pans that show the flow lines of the metal converge toward the top, and especially at the corners where the drawing conditions are similar to the cylindrical shell, scribed with parallel lines as described just previously. (The end).

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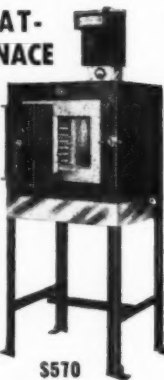
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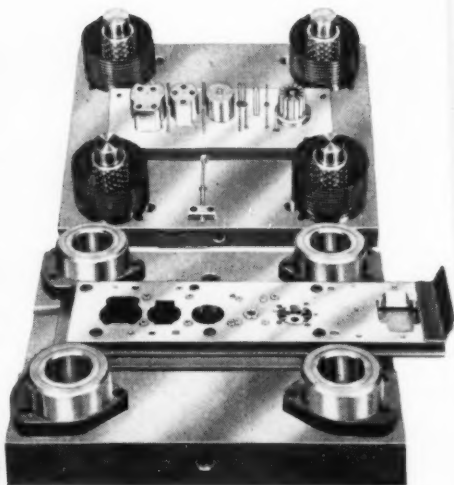
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## ANALYZING THE CAUSE OF

# *Failures in Weldments*



by **Gerald von Stroh**, Assistant Manager, Development Engineering, Lukens Steel Co.

Why do certain weldments fail under service conditions? Sometimes it is not the fault of welding, but the fault of improper designing. Frequently the metal being welded cannot withstand the stresses to which it is being subjected under service conditions. An analysis of various failures, their causes, cures, as well as fundamental design facts are presented by the author.

**A** CLINICAL approach to the design of weldments is a study of the behavior of welded structures, particularly failures of welded structures, during and after their service life, much in the same manner that a physician approaches a human ailment and learns it.

The need for such a clinical approach is the result of a combination of features peculiar to weldments. Such as the frequently overlooked fundamental that a welded structure is one piece of metal and that for economical reasons that one piece of metal may have designed into it internal and/or external notches and incipient cracks. Such notches and cracks, as will be discussed later, may drastically affect the endurance limit of the welded structure.

In a statically loaded structure, such as a bridge or building, endurance limit as a design factor is of little or no importance. For practical purposes there are no reversals of stress applied to the structure.

On the other hand, dynamically loaded structures such as machinery parts, automotive parts, railroad car and locomotive parts, and chemical or processing equipment subjected to thermal stresses and changes



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in pressure are structures whose service life depends upon their ability to withstand repetitive reversals of stress. Therefore, endurance limit or fatigue characteristics of the gross structure become in the final analysis the design criteria rather than ultimate or yield values of the material involved. Since endurance limit, as will be shown later, is extremely sensitive to notches, cracks, and shape it becomes apparent that the greatest need for a clinical study of weldments lies in the field of dynamically loaded structures. Therefore, the comments and conclusions of this article will be confined to dynamically loaded structures.

A clinical study of weldment design should utilize laboratory and mathematical methods of stress determination to the fullest extent possible. However, their use should be tempered with a realization of their limitations.

Experimental stress analysis of a gross structure will give stress levels, but it will not tell how long the structure subjected to reversals of stress will live at those levels.

There are no systems of mathematics which will determine the fatigue value of a gross structure. Usually we will take the known static loads, apply a factor of safety or of "ignorance" and trust all will be well.

Full-size fatigue testing of a gross structure will essentially give us the required data, but unfortunately full-scale fatigue testing is usually too expensive and the structures too large to make this a practical method for many applications of welding.

It would appear, therefore, that the practical course is to use conventional methods for proportioning the members of a structure and by clinical study of service behavior develop a qualitative feeling for what is good practice to permit the gross structure to function in a predictable manner.

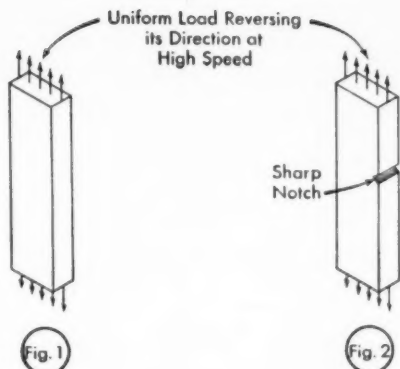
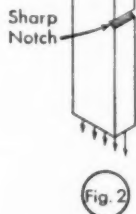


Fig. 1 pictures an ordinary well-made structural steel with a yield point between 30,000 and 40,000 psi. If a load is applied to it and reversed—parallel to the length of the bar and uniformly over its cross section—its endurance limit will be approximately one-half its ultimate strength.

If the bar is notched, as shown in the illustration in Fig. 2, the endurance limit, expressed in pounds per square inch, will be considerably reduced.

A profound fact (involving the constantly increasing use of high strength steels in weldments) recognized by the more "scientific" researchers but often blandly ignored by so-called "practical" designers should be emphasized at this point. Conventional fatigue specimens are made carefully to avoid stress concentration at the critical section. The endurance limit obtained from conventional specimens increases approximately in proportion to the tensile strength. In other words, if a high strength steel is used, its endurance limit under ideal conditions is proportionately increased.

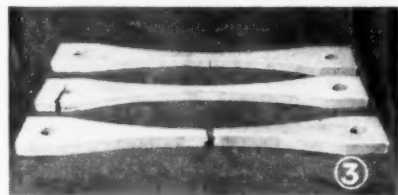
However, if a sharp notch is introduced, as in Fig. 2, the fatigue strength is about the same for high and low strength materials. This indicates that there is little value in using the more expensive high strength steels in a dynamically loaded structure wherein notches exist. Despite this, there are many dynamically loaded structures in service today involving the use of high strength steels with innumerable stress raisers of this nature in them. Frequently, it seems, high strength materials have been used in a very unintelligent manner.



Recently, four specimens were run in a fatigue machine, at a stress of 34,200 psi. Fig. 3 shows three of the specimens after the test, the fourth is being retested at a higher stress.

Two specimens did not fail where it was thought they might despite 5,000,000 reversals of stress. One of these—the one shown in the center of the illustration—failed through a connecting bolt hole, shown at the left.

The bottom specimen in the illustration failed at 3,000,000 cycles, following an accident which happened at 72,000 cycles. The accident occurred when the adapter broke, bending the specimen. It was straightened subsequently and the test was resumed. The endurance life of the specimen was affected materially by the accident. The history of this specimen indi-

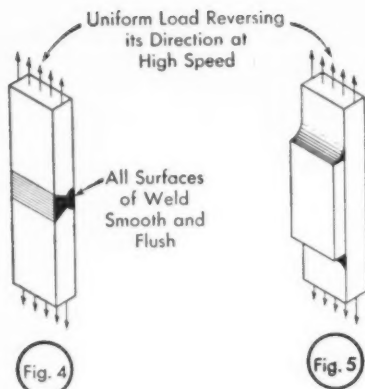


cates, in a general manner, the sensitivity of materials under such conditions.

From one standpoint, this test is a very satisfactory performance, although it cannot be a final determination of endurance limit. This seemingly insignificant experiment was carried on for the practical reason of showing that a welded joint can be executed with an endurance limit approximating that of the parent metal. If the weld is not internally sound with smooth external contours the life of such a specimen would be shortened materially.

The specimens just described were welded as shown in Fig. 4. A second principle is illustrated in Fig. 5. By means of fatigue machine investigations, it has been determined, definitely, that the addition of material as shown shortens the life of such a dynamically-loaded sample.

Weldments, so loaded, are being designed, as shown in Fig. 5, despite the fact that some of them have failed. Such con-



struction necessarily should not be eliminated, since certainly many liberties can be taken in regions subject to secondary loading conditions.

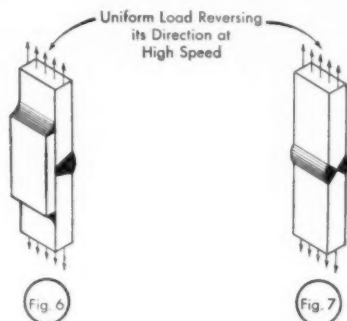
Weldments are still being designed with variations of the conditions shown in Fig. 6. This type of weldment is little improved over the one described in Fig. 5. Here, the judicious use of such conditions is entirely proper. However, the designer must, of necessity, have a nice feeling when and where such construction might be used without distress.

At one time, welded joints were specified with so-called reinforcements as shown in Fig. 7. However, most specifications now limit such "reinforcements" to one-eighth inch thicknesses.

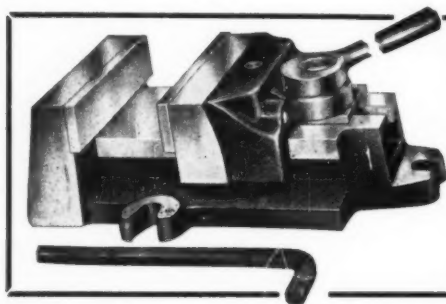
Why a weld of the type shown here is specified is an unanswered question.

Perhaps the idea is to provide more metal on the chance that the joint would not be so good as expected for one reason or another.

Why such conditions, as shown here, will have an effect upon the fatigue strength of a piece of steel might be considered briefly. If this piece of steel were considered as a pipe with fluid running through it under high pressure, it would be seen readily where turbulence would occur. To a certain degree, stress, while



it is an intangible, flows through a piece of steel and a gross structure much in the manner that fluid flows through a pipe and pipe system. Wherever turbulence would occur, if the structure were a system of pipes, an interruption in the flow of stress would occur and cause a stress concentration. If a designer will carry this simple analogy in his mind when designing a welded structure and bear in mind the fact that a weldment is one piece of metal, he probably will design a more predictable weldment.



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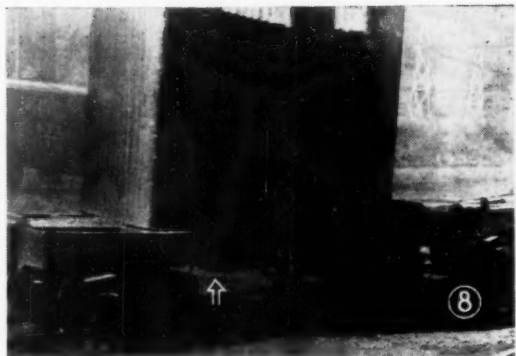
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Fig. 8 shows a structure car frame, loaded with steel ingots in which failure occurred at a design detail similar to that just described. It is obvious that the designer could not predict the occurrence of failure in this car frame, otherwise it would not have occurred. Depending on the usual flexure formulae, estimating loads imposed, and applying the factor of safety, the designer disposed his material.



Two design uncertainties of vast proportion existed in this structure. First, the stress augment due to impact could only be guessed. Such unpredictable impact forces are two-fold in such a structure. The designer cannot control definitely the maximum load or the ease with which it is applied. Loading of slabs or ingots can affect peak stress levels tremendously with the impact varying considerably. Second, the superimposed stresses due to impact while the car is in motion, likewise, could only be surmised. Such stress augment varies, of course, with speed, track conditions and general handling, such as coupling.

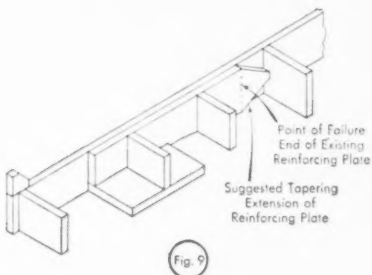
These unpredictable factors, naturally suggest the use of experimental stress analysis so that operating stresses on pilot models can be determined definitely.

The second important design uncertainty involved here is the notch sensitivity at the point of fracture. This point was in the side member of the car in this illustration below the left and center ingots.

The fracture occurred at the end of an inner reinforcing member and cannot be seen in the illustration. While such a notch effect externally is large it is still a notch. An abrupt discontinuity of metal occurs at the point of fracture.

The designer did have a measure of control here if he possessed a proper feeling for elastic and plastic actions of steel plate. He could have eased the contour at the change in metal sections by making it gradual, and this would have permitted a smooth flow of stress.

Fig. 9 shows an internal view of the construction, which pictures one method of achieving a gradual change in metal section. This is only one of the methods that can be used to achieve the same end. It is simply a tapering extension on the rein-



forcing member which provides a gradual change in the rigidity of the structure at this point, thus eliminating the severe "notch effect."

The designer's knowledge or feeling in proportioning such an "easement" is, however, purely qualitative. He had no quantitative values or methods dictating the proportioning of this gradual change in section.

Some may believe that such detail can be determined mathematically but proof of any such methods applied under dynamic

conditions remains to be seen. Considering the number of unknown factors in this instance, "speculative designing" certainly existed. Without experimental analysis or without good luck, hundreds of such struc-

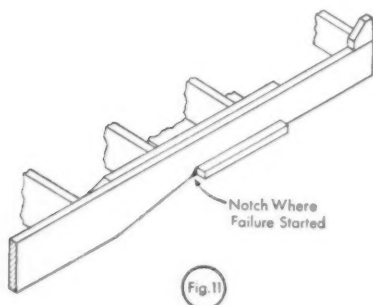
tures could have been put to use before weak spots were discovered. All this, of course, is one reason for the emergence of "experimental stress analysis" as an organized function of engineering.

While a failure in the previous illustration could not be pictured, Fig. 10 shows that a failure did exist in this structure. Here are the results of a notch effect of a totally different type from those previously discussed. The fractures progressed from an internal notch at the root of a chamfered weld. No possible shop control, quality of welding or inspection could eliminate this condition. The notch or abrupt discontinuity actually was designed into the structure.



Fig. 11 shows why this failure occurred. The fracture undoubtedly started at the root of this weld. It progressed, probably to the bottom, then worked up through the entire section. Nothing can eliminate the possibility of failures of this type excepting redesign. The weak spot could be avoided simply by setting the bottom plates between the primary members. This would eliminate the notching of primary side members.

Many engineers are prone to this kind



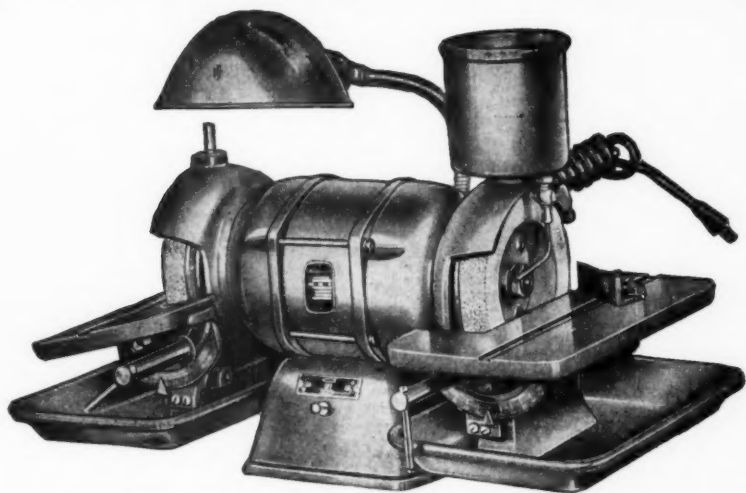
of designing. Many times, probably more often than not, they "get away" with it. But, here is physical evidence of at least

one instance wherein it didn't work. Hence, it is a fair conclusion that when failure does not occur at such a point, two things are true: Dynamic loading to an appreciable degree does not exist, or if it does, the structure has not been in service long enough to show distress, a dangerous situation economically; or, the structure is vastly over-designed.

Fig. 12 shows a failure that is due, apparently, to the impact of handling, plus the thermal effects of drastic changes in temperature. The structure is a charging box, or pan, a familiar piece of equipment in steel plants. Its function is that of a receptacle for the elements of open hearth furnace charges or loads, notably scrap metal. Charging boxes are loaded with material, handled in various ways throughout the plant and fulfill their final function of being thrust into a furnace of approximately 2800° F., turned over, thus dumping their "charge," and pulled out, empty. Again, here at the fracture is an abrupt change in metal section. In addition, the root of the weld, by its nature undoubtedly provides a distinct notch effect.

It must be remembered, too, that nothing in the predictable function of the charging

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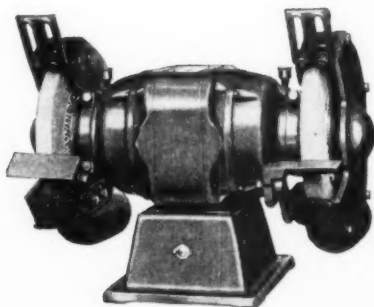


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box could foretell failures. No forces in operation conceivably could cause such failure insofar as existing design criteria are concerned. Abuse is possible, but these failures were epidemic. They occurred on several boxes. The thermal effect mentioned is real but it could hardly be predicted accurately.

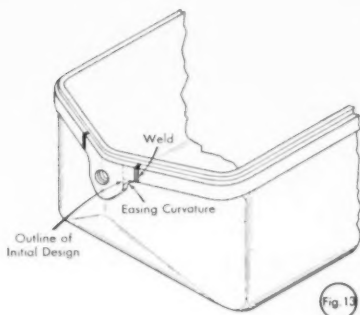
The designer's responsibility here, therefore, is to feel the necessity (dictated by operating conditions) of eliminating abrupt changes in contours. In the absence of more definite data, to design with the worst in mind.

**Fig. 13 shows one method of achieving longer life without fracture occurring.** This method is a design in which the contour is changed gradually to eliminate the concentration. Only results can prove the efficiency of such a design detail.

The point to be noted here is that such failures can be peculiar to weldments. The nature of foundry processes dictates that changes in section be gradual throughout to assure a good casting. This can be one reason why designers seemingly continue to ignore the design points that have been cited. They have been trained in the technique of casting design wherein they must observe certain shape rules. Released from this restriction they cannot be blamed for ignoring necessities that are such for totally different reasons.

A mystifying type of failure is that in which a purely secondary member, or its joints, shows distress. **The end plate on the engine frame shown in Fig. 14 is in this category.** This member is simply a closure plate sealing off certain parts of the mechanism and providing support for auxiliary units. This plate is machined over its entire surface and is drilled and tapped in many places for the support of the blower housing.

The central opening is provided to admit air. In its design a maximum size of opening was desirable.



**Fig. 15 shows the construction of the frame in the region of this opening.** The two slanting inner members carry a primary load to resist the tendency of the firing load to increase the distance between the cylinder head and the main bearings. Thousands of these engine frames were manufactured during a period of several years.

But, in one instance, distress appeared in the fillet weld connecting the end plate with the primary member, at the bottom of the elongated opening. This short fillet weld fractured.

When a failure of this nature happens, with thousands of similar units in service, two worrisome questions naturally occur to the designer: First, can it be an epidemic is started that will culminate in failure of every unit at this point? In other words, is it a fundamental design weakness? Or second, did the unit on which distress first appeared undergo abnormal service conditions?

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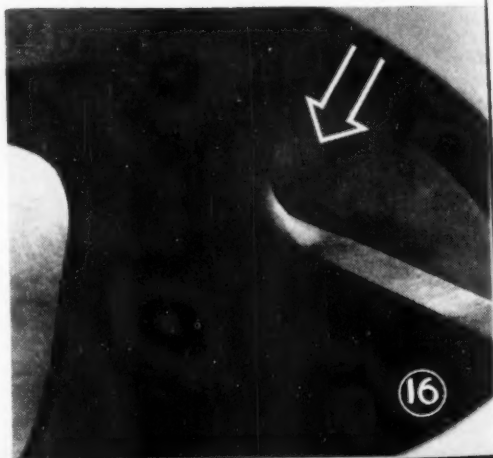
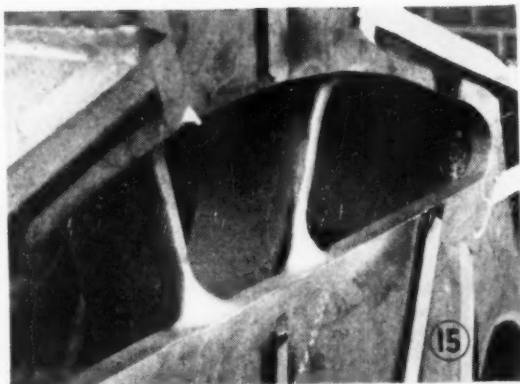
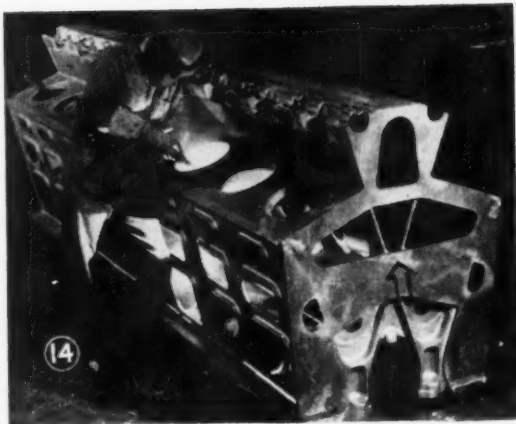
In the instance cited, failure finally evidenced itself on several frames. And, insofar as could be determined, the frames showed no distress at any other location. If the failure were confined to one or two frames, the conclusion might be drawn that the welding was below average standard. There were, however, a sufficient number of frames involved here to permit the assumption that the average of quality was involved. These frames were varied in their ages—they were not all produced in one batch that might have been made under similar conditions.

Superficially, this failure might seem of a minor nature. It is to be noted, however, that once the fillet weld in question develops a crack in its surface—a severe notch exists in the edge of a primary member.

The frames involved were repaired in the manner shown in Fig. 15. The defective weld was removed completely and a gradual "easement" or "fairing" was created by weld metal as shown.

Here again the correction is based on the elimination of abrupt changes in metal section, or of the abrupt change in stiffness of the structure at this point. The ability of the structure to absorb energy without distress was changed in this region. Fig. 16 shows the details on the reverse side, or interior, in the region shown in Fig. 15.

On future production of such frames the correction is simple. Fig. 17 shows how abrupt changes can be avoided in an economical manner, at the expense of a slight reduction in the area of the opening. However, it is obvious that such a design change would tend to reduce the level of maximum stress induced by the conditions causing the failure.



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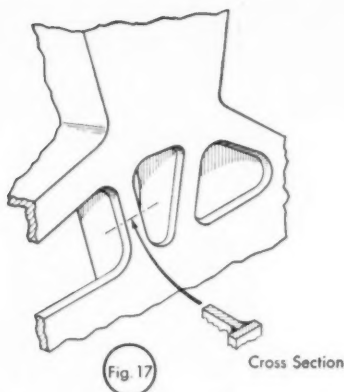
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**Fig. 18 shows a frame for another type of diesel engine that has been produced in large quantities for a number of years. It is for a general purpose engine used mainly for auxiliary power on shipboard.**

In 1943, failure occurred in this frame of a type which definitely indicated unusual service, something that was practically impossible for the designer to foresee.

Of thousands of frames produced for these engines only approximately 30 showed distress. Thus, the design adequacy of the frame was proved most thoroughly. In further support of this statement is the fact that all failures occurred on engines in a particular type of service on a particular type of ship.

Two things became apparent in the investigation of this failure: First, the nature of the service was such that the engine might be subjected suddenly to peak load conditions at full speed; second, the ship seemed to be of such class and in such service that it rolled and tossed violently.

Trouble with foundation bolts bore out these conclusions, in addition, information on the conditions encountered at sea indicated severe inertia forces due to the swaying mass of engine.

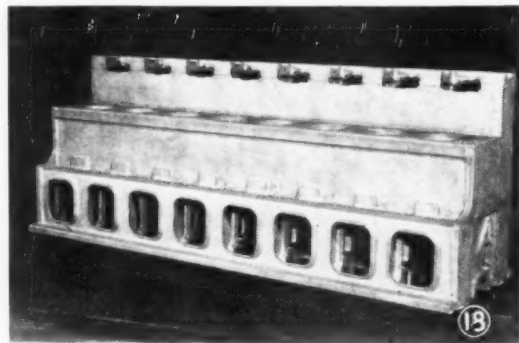
In this instance, failure occurred in a secondary member an oil-confining side

plate, 3/16" thick, of ordinary carbon steel, of welding quality and not structurally important. The designer had no idea any stress could possibly be induced in this member that would cause its failure.

Generally, the fracture started in the extreme lower corners and progressed toward the first or last lower openings to be seen in the illustration. No failure occurred at any other point in the structure. Under abnormal service, failure might be expected to appear in, or adjacent to, a highly loaded member.

One thing is evident from the facts—the distress was related to the hold-down or foundation bolts. Possibly pre-stress occurred in the fracture region because of the elasticity of the foundation. If sudden and severe peak engine load occurred simultaneously with a violent sea, it is probable that the combination might cause abnormal stress in the region of the foundation bolts. Naturally, the acme of such abnormally high stress would occur at the ends of the frame where the lower portion of the frame is most rigid.

There is where trouble occurred with bolts that tied the engine to its foundation. Apparently, bolts in the lower rail toward



the center of the engine were relieved by the flexibility of the frame in this region. In any event, this engine frame has not shown any other weak spot after years of use in various applications. Furthermore, this one type of failure has not evidenced itself, so far as is known, in any but this one type of service.

Thus, with the steelyard car frame and the charging box, we have now seen two types of failures which can be considered as resulting from a lack of attention to design details. A third instance is the failure of the fillet weld in the opening on the engine frame end plate. This failure is the result of a combination of two factors. On one hand, the design was at fault for the abruptness of change in contour and should have been suspected as a possible trouble

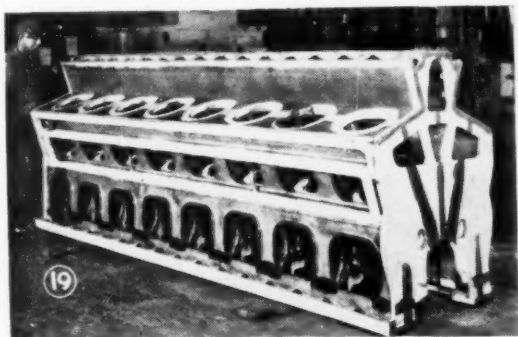
point. On the other hand, the design apparently is adequate for most types of operating service, for a very small percentage of engines in service have shown failure at this point.

Here again, a peculiar type of service and apparently not poor design seems to have induced failure in a relatively few frames. The failure, at least, did not occur in a region that might be criticized as being poorly designed.

**Fig. 19 shows another type of failure that might be considered, involving abnormal conditions.** It pictures the behavior of a structure in normal service for a considerable period but apparently suddenly subjected to abnormal forces.

An engine with a frame similar to that shown here was put in service several years ago. Since the engine was operated for about 10,000 hours as one of the propulsion units of a submarine, it would seem reasonably safe to conclude the design had proved entirely adequate. In addition, innumerable other frames of this type were in similar service.

During World War II, however, the submarine was depth-charged many times, on one occasion so violently that she was blown to the surface. Sometime following these experiences fractures were discovered in the engine frame.



Subsequently, this failure was investigated thoroughly, as the result of which 126 cracks were found throughout the frame structure. Many of these fractures started at stress raisers such as machined contours. Others started at the edges of openings. Many cracks originated in the welds connecting secondary members in the structure. But, none of the fractures occurred in either the welds or the parent metal of primary members.



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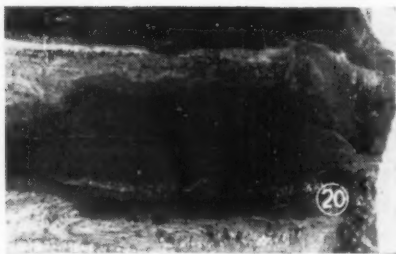
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**Fig. 20 shows the surface of a fracture in a weld joining a secondary member to the upper portion of the engine. It is apparent that this fracture originated in the interior of the weld, starting from an unused area and progressing outward toward the surface. The unfused area at which the crack started provided, of course, an internal notch effect.**



**Fig. 21 illustrates another type of fracture in the same secondary member. This crack, through the parent metal adjacent to the weld, obviously originated on the surface at a notch effect induced by poor contour at the edge of the weld.**

**Fig. 22 shows a fracture occurring in a fillet weld connecting a machined supporting rail to the side of the frame.**

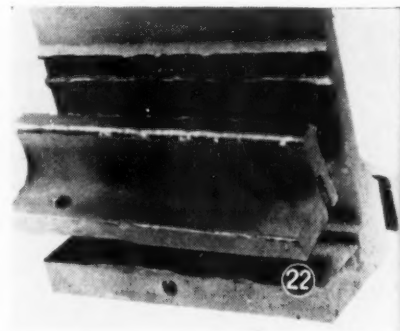
This crack has certain peculiarities. First, it originated on the surface in the center of the weld, which would seem to indicate that the force initiating the fracture was simply of such magnitude that the fillet wasn't heavy enough. Hence, failure occurred in what might be termed an ideal manner for a fillet weld, from the surface through the throat of the weld. The fillet

did not fracture at its edge due to undercutting or overlapping. The fracture did not follow the boundary zone between weld metal and parent metal, as sometimes happens. It is to be noted that the crack shown was not continuous. The shiny portions reveal the unfractured area of the weld torn apart in the investigation so that the fractured surfaces could be laid open. This failure, then, consisted of a series of small cracks on the surface, extending approximately through one-half the throat thickness of the weld. (These cracks can be seen as the dark portions on the surface of the fracture.)

Why wouldn't a fracture, started by an abnormally severe shock, progress continuously, instead of as a series of short cracks separated by narrow widths of unfractured metal and extending inwardly to about the center of the weld? That these cracks outlined a weak zone in the weld, undoubtedly caused by slag inclusions, is a logical conclusion. More minute investigation subsequently proved it.

Fracture, possibly, was caused by the inertia of the mechanical mass bolted to the rail during severe over-all shock, such as might occur during depth bombing. The apparent significance of the failure in this engine frame is that the primary member withstood the severe shock. It seems reasonable to assume, therefore, that the design was adequate.

There were no fractures discovered in any member, failure of which possibly would have caused the engine to cease operating. Yet the design was so close to



the edge in its economy that many fractures—126 of them—did occur under abnormal shock. It would be difficult to predict the length of time that the engine could continue in operation even though these fractures existed.

It is known that the ship travelled many thousands of miles with at least some of these fractures in the frame. But there

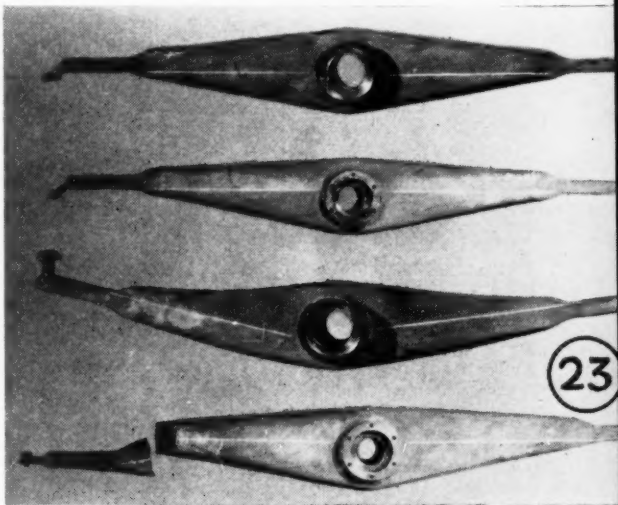
is no way of knowing to what extent the fractures progressed during this continued operation. This example is a manifestation of the stamina of steel engine frames.

In the early days of World War II, iron frames were found to shatter under such conditions, making operations of engines impossible.

**Fig. 23 shows four weldments utilizing a relatively high strength steel.** These are experimental structural parts of a very heavy automotive truck. It is fortunate that these parts were experimental, or pilot models, considering what happened to them.

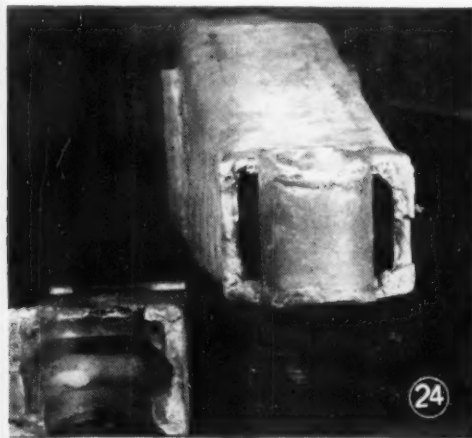
In service, the two weldments shown at the bottom of the illustration operate as simple beams with side thrust imposed in addition to vertical loading. The two beams are positioned one above the other dividing the load.

The sequence of failure is interesting. In the beam at the bottom in the illustration, the left member of it failed



completely, the end breaking off as can be seen. The failure occurred because of a defective weld. The failure of this beam threw an abnormal load on the other, the member shown immediately above it in the illustration. The result of this abnormal load can be seen. This second beam failed in bending; a failure of the gross structure. It is to be noted that the same welded joint existing in all beams did not fail in spite of the obvious overload of this left beam. It is to be noted further, that the two members uppermost in the illustration showed no distress. These beams operate in similar manner on the opposite side of the vehicle.

Conclusions regarding this failure can be illustrated in Fig. 24 which shows the fractured surfaces on the lowest beam, with the fracture clearly following a butt weld. The end member, or lower piece, was

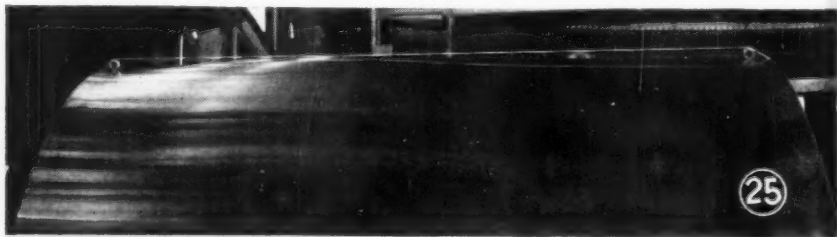


welded to the other portion. This weld was completed and made predictable by utilizing a circular hole in the upper and lower surface. A tubular piece was then inserted in this hole and welded top and bottom. Obviously, these closing welds could be made only from one side. If the lower edge of the bottom piece is examined, the causes inducing failure can be determined. It will be noticed that the weld is cracked out almost to the surface, with the fracture area oxidized. This can mean only that the interior of the weld was cracked before the piece was put in service. This crack progressed, after the part was in service for some time, until the end broke off completely. Seven other points in the structure, designed in exactly the same manner, did not fail. Two such points on the bent beam previously shown did not fail even under such abnormal load.

This is a poor design not because failure occurred at one point out of eight, but because it was at a point which could not be checked by visual inspection. Nor could this weld be inspected conclusively by X-ray because of its design. Hence, such design detail cannot be permitted in quantity production of beams of this nature.

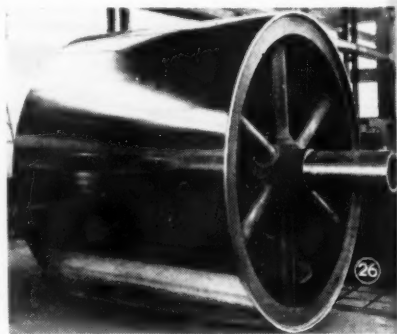
This illustration serves to emphasize the fact that weldments involving high strength steels are being applied in service where completely predictable joints are demanded. The solution is not to eliminate the welded joint by redesign . . . but to change the design so that the quality of joint will be completely predictable.

Fig. 25 shows a failure radically different in nature from those that have been considered. This is a polished jacketed-type cylindrical steam drier roll, of a type produced for many processing industries such



as papermaking and printing. The roll is 8'-0" O.D. with a 6'-10" face. Weight is 17,685 lbs.

It is apparent that something went wrong on this roll to distort it. In testing this roll with hydrostatic internal pressure, the pressure, accidentally, drastically exceeded that required with the result the outer shell bulged in the manner shown in the illustration. The roll, of course was useless in such condition and it was necessary to replace the outer shell and rema-



chine it. Fig. 26 shows a full view of the roll, giving an idea of its over-all design.

This failure is of interest because previously no one had any idea how this type of weldment would withstand abnormal loads. In this failure, there is reason to believe that maximum pressure inducing failure was several times the design pressure.

Fig. 27 shows the construction details of the drier roll and indicates the manner of failure. No fracture occurred anywhere in the structure causing leakage. The one-

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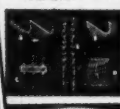
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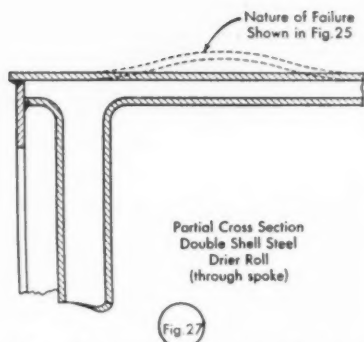


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sided corner welds with notches on their inner sides did not fail. This is to be particularly noted since one would expect distress at the inner notch behind the weld in the upper corner. One might expect this because of the ripping action of the bulge shown on this weld.

Ultimately, of course, something would have opened up but the accidental high pressure was discovered before this could happen. The main point in discussing this

failure is to indicate the proper use of weld details that are unpredictable in other types of services; hence liable to failure. In contrast to the dynamically-loaded engine frames previously discussed, this drier roll weldment operates under practically static conditions. A weld of this nature is never used in the design of an engine frame.

Such one-sided welds with unfused roots were used in secondary regions in a very early type of engine frame. They failed consistently in all frames produced to this design. It was necessary to revise the design to eliminate them and to repair all frames in the field.

However, there is no reason for any fear regarding the adequacy of such corner welds in drier rolls, for structures with such welds have been in service for many years. But, how such welds would behave under accidental overload remained to be seen. Whether the weld would rip due to its internal notch from the flexure caused by the bulging of the shell is a moot question. In this instance of apparently drastically abnormal pressure no distress oc-



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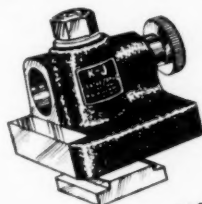
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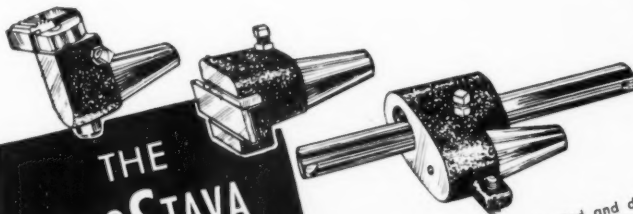
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curred in the welds indicated.

One of the reasons for discussing this type of failure is that some designers err in the other direction of too much caution. At times fabricating shops have been furnished blueprints of designs that specify full strength welds in every joint. If followed to the letter this specification would result in an extremely costly weldment.

Few, if any, weldment designs, excluding pressure vessels, require completely full strength joints at all points. This is not true for all pressure vessels, but only to thick-walled vessels subjected to very high pressures. By "full strength weld" is meant one that is fused completely throughout the full metal thickness and subject to meticulous inspection under the usual standards. From this, it is apparent that it is incumbent upon the designer to follow the "middle of the road" with a true feeling for what a particular joint must withstand.

\* \* \*

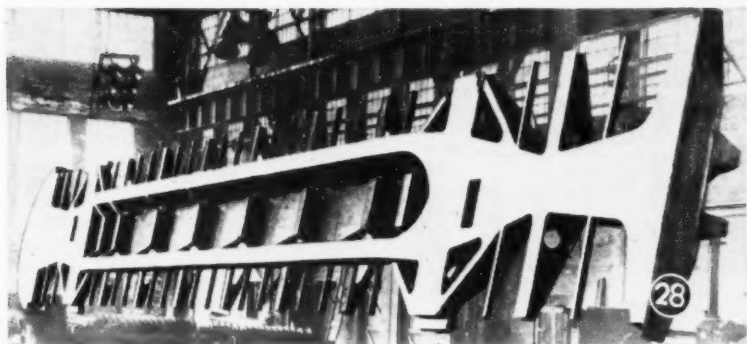
Much remains to be learned regarding the structural behavior of dynamically loaded fabricated parts. It is true that a fine knowledge of the properties of materials exists. It is true, too, that certain types of welded joints can be evaluated and their quality be controlled.

But what happens to such structural properties when materials and joints are disposed in all manner of shapes, is not known with any accuracy; especially when dynamic loading is imposed at times on such shapes which might be exposed to violent fluctuation beyond normal stress levels.

On two recent occasions, high strength steels were used, apparently without recognition of their possibly poor endurance limit when notch effects exist. Recognition of the structural behavior of dynamically loaded structures was not present because a myriad of internal and external notches existed in the design.

Generally, the cost of making full-size experimental stress analysis studies is prohibitive. If the nature of the work justifies experimental stress analysis, it must be remembered that such analysis tells nothing about the life of the structure at such levels.

Much work has been done in developing machines for full-scale fatigue testing. However, the cost of such equipment and the



expense of operating it are so high as to limit this field of investigation to companies producing large quantities of the identical product or part. Therefore, designers must continue to grope, using knowledge of material properties established under ideal conditions. And continue to apply the factor of safety—or of "ignorance."

Why this method is not sufficient since it has worked for so long is a logical question. Why it is not sufficient may be answered by these two reasons: first, fabricated structures are being designed to operate at increasingly higher stress levels; second, weldments by their nature may contain internal and external notch effects.

Elimination of notch effects is entirely prohibitive from the standpoint of cost and of the resulting limitation on design freedom. It seems, therefore, that careful, correlated study of failures is the one re-

maining way of obtaining data of practical value, a recognition of the fact that a failure is an opportunity to learn something rather than an occurrence that must be hidden.

With such a program it can be said with confidence, basic principles of the behavior of dynamically loaded structures would emerge.

Fig. 28 shows the underframe of a passenger diesel locomotive of a post-war model 78' 5-5/16" long, by 8'-11 1/4" wide, by 3' 2-7/16" high. It also represents the tremendous strides taken by the welding industry. This underframe weighs 32% less than its pre-war counterpart—a reduction of 13,000 lbs. Such a design accomplishment is made possible by a clinical study of weldment failures and by intensive attention to design details—both economic and structural. THE END.

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'The Humidity Controlled Abrasive'

# CHARLES H. GALLMEYER 1880-1948

Charles H. Gallmeyer, 68, president of the well-known firm of Gallmeyer and Livingston Company, Grand Rapids, Michigan, died at his home, December 31, 1948, after a long illness. In addition to heading the firm which he helped to found, the prominent industrialist was a director of the Michigan Consolidated Gas Co. of Detroit, and a member of the advisory board of the Grand Rapids Gas Co.; a director of the Wolverine Brass Works, and president of the Metals Mutual Insurance Co. of Grand Rapids.



In 1899 he began his career as a clerk for R. G. Dun & Co., Grand Rapids. His rise in the business and industrial field was rapid. By 1908, he was in the wholesale lumber business, as a partner in the firm of Davidson-Gallmeyer Lumber Co., Toledo, Ohio. In 1912, he sold his interest in this business and returned to Grand Rapids as treasurer of the Valley City Machine Works.

In 1923, this firm merged with Grand Rapids Grinding Machine Co. and the Union Machine Co. to form the Gallmeyer & Livingston Co., of which Mr. Gallmeyer was first named treasurer.

Charles H. Gallmeyer was nationally known throughout the machine and tool industry. His passing will be deeply felt, not only in his own organization, but by his wide acquaintance of friends in the industry for a considerable time. He is survived by his wife, Leona, a brother, William, present treasurer of the firm, and by two sisters, all of Grand Rapids.

# INDEX OF NEW ORDERS AND SHIPMENTS OF MACHINE TOOLS

Base—Average Shipments 1945-1946-1947=100%

Date	New Orders (Total)	Foreign Orders (Included in Total)	Shipments (Total)	Ratio Unfilled Orders to Shipments
<b>1947</b>				
Apr.	69.8	18.8	93.3	5.3-1
May	76.9	16.3	89.2	5.2-1
June	90.9	17.2	84.1	5.5-1
July	81.1	16.7	65.2	7.4-1
Aug.	62.1	14.6	63.6	7.5-1
Sept.	63.7	14.7	77.0	5.9-1
Oct.	81.0	16.0	94.8	4.6-1
Nov.	75.6	11.5	84.7	5.1-1
Dec.	81.1	14.8	98.4	4.1-1
<b>1948</b>				
Jan.	83.1	14.0	75.3	5.4-1
Feb.	77.3	12.7	87.1	4.7-1
Mar.	86.3	16.1	83.6	4.6-1
Apr.	86.3	14.1	82.0	4.7-1
May	73.5	11.4	82.6	4.5-1
June	83.4	11.9	94.4	3.8-1
July	74.0	13.3	62.4	5.9-1
Aug.	73.7	13.6	69.8	5.2-1
Sept.	73.1	11.6	84.7	4.3-1
Oct.	67.4	14.0	80.4	4.2-1
Nov.	p 73.0	p 18.5	p 75.5	p 4.4-1

p—Preliminary Figures.

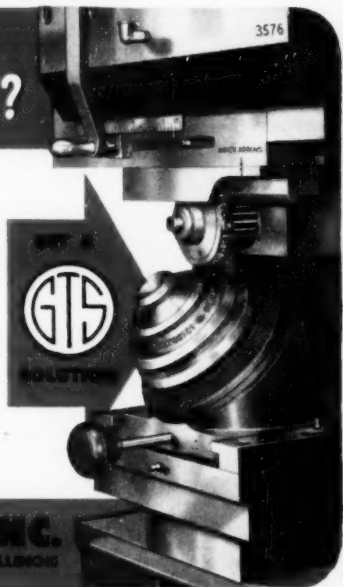
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## GRADUATING EQUIPMENT

By

John E. Hyler

Those who build machines and various other kinds of equipment have need for some means of accurately graduating certain elements. Some of these components are round. Cases in point are various kinds of micrometer collars, bases for swivel vises, etc. The usual principle involved in marking accurate graduation on such pieces is to make a rotary graduating die, having a circumference equal to that of the workpiece. The workpiece is mounted on one spindle, while the die is mounted on another. Then, by bringing the die and workpiece tightly together, and rolling them one on the other, the figures or numbers on the die are rolled into the workpiece.

In order to be sure that the die does not slip, relative to the workpiece, the two spindles are connected together with highly accurate gearing, so that both of them must make exactly a revolution at the same time. This makes it possible to rotate the die over the work two or three times, if necessary, for very plain graduating, without any chance of it getting out of registration with the marks placed on the work the first time around.

The rolling type of graduating die is always superior to any attempt to press a flat die against the work, even though the workpieces themselves may be flat.



# MOTO-TOOL

## SAVES TIME — CUTS COSTS

Because **Moto-Tool** is small it is easy to handle. It can save you hours by speeding up work now being tediously done by hand. Use **Moto-Tool** for light finishing operations, touching up dies (without tearing down "set-ups"), sharpening tools, etc. **Moto-Tool** proved itself during the war in plants as G.E., Westinghouse, Ford and others . . . also used by the Armed Forces. Has sturdy, shockproof bakelite housing with "pencil-type" finger grip • Instant-action, wrenchless chuck • dust-filtered air-cooling system • Oil-less (sealed) bearing • Over-size armature shaft, hardened, ground and polished • 110 V., universal type (A.C.-D.C.) motor • Weighs only 13 oz. • Dynamically balanced for vibrationless operation.

### MOTO-TOOL KIT No. 2

WITH 23 ACCESSORIES

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WITH EMERY POINT

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**Moto-Tool Kit No. 2**, with 23 accessories (high speed steel cutters, grinding wheels, polishing accessories) and heavy-duty Model 2 **Moto-Tool** in natural finish, hardwood case . . . **\$23.50**. (Items purchased separately would cost about \$30.00; you save \$6.50).

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If he does not handle **Moto-Tool**, write the factory.

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The reason this is true is readily understood. When a rolling die is used, all of the available pressure at any given instant is localized on line contact. Therefore, a much more clear indentation can be obtained with the amount of pressure being used. This is equivalent to saying that far less pressure is required on a rotary die. It is entirely possible to maintain accuracy in passing a rotary die over a flat workpiece to be graduated, even though it may pass over the work more than once. Accuracy on such work is maintained by a rack and pinion.

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Cap.: 4" to 6" diam.

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22% to 29% less than comparable models. That means less employee fatigue, easier operation in any position, greater productive output per employee and per tool and—best of all—lower production costs. If it's a job for a portable air tool, it's a job for a new STREAM-POWER Buckeye.



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# BUXITE

GRINDING WHEELS FOR CARBIDE TOOLS

## MANSO GRINDING WHEEL COMPANY

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*Important  
Announcement*

Industries Grinding Carbide Tools  
Everywhere, United States

Gentlemen:

We realize that all BUXITE grinding wheel users are concerned about the future supply of BUXITE wheels for grinding carbides and other tough steels.

We hasten to assure you that there will be no interruption in the availability of BUXITE wheels.

We were very glad indeed when we were asked to accept exclusive control of the BUXITE process for the United States. We are immediately pressing for additional production of BUXITE wheels in a wide range of grain sizes for all standard carbide grinders.

Through the engineering and sales of thousands of BUXITE wheels to the industry in the Middle West, we are thoroughly familiar with the application and advantages of these "case hardened" wheels.

Our Cleveland warehouse stocks are immediately available to you and we will try to meet all of your requirements. In addition, please call on us for any help or service you think our engineers can give.

We believe the acquisition of the BUXITE process contract to be one of the most important things that has happened to us in our 25 years in the grinding wheel business. Knowing, first hand, the thousands of dollars our customers have saved in diamond wheel consumption through the use of BUXITE wheels, we anticipate with pleasure making them available to industries throughout the United States.

Don't hesitate to write us if we can be of service.

Yours very truly,

*George A. Miller*  
MANSO GRINDING WHEEL CO.



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MANSO GRINDING WHEEL CO.

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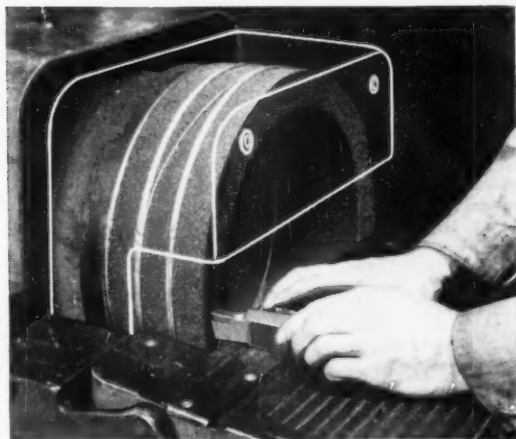
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Exclusive Suppliers of BUXITE Grinding Wheels

# BUXITE

GRINDING WHEELS FOR CARBIDE TOOLS

## LIGHTER FEED... COOLER CUTTING



### THE BUXITE PROCESS

(Formerly Controlled by The Bridgeport Safety Emery Wheel Co., Inc.)

The Buxite Process is a revolutionary method of coating each individual grain of Buxite wheels with a microscopically thin shell of carbon in an isotropic vitrescent form. Each shell permits its grain of abrasive to turn, exposing every cutting surface before it is worn away. Each succeeding layer of grains are contained in their individual carbon shells, assuring constant grinding action during the life of the wheel.

**REPRESENTATIVES NOTE:** There are a few desirable territories available to well qualified representatives. If you are interested, write us, giving full particulars of your operation and qualifications.

Buxite grinding wheels perform better and actually cut faster with light pressure. This means that carbides and other superhard steels can be ground with less heat being generated... which prevents checking and cracking, lengthening the life of the tools.

### GRIND CARBIDE TOOLS AT 75% TO 85% LESS COST

Not only do Buxite wheels increase carbide tool life, but they give a cleaner grind and better finish. Buxite wheels do not "load" when grinding sintered tools, eliminating frequent stops for dressing, and the hard-shelled grains makes the life of each Buxite wheel 4 to 6 times that of ordinary wheels.

### REDUCE DIAMOND WHEEL CONSUMPTION

The lighter cuts and cooler grinding action of Buxite grinding wheels results in excellent finish on Tungsten Carbide and other types of superhard alloys. Buxite wheels always reduce and frequently eliminate the need for diamond wheel grinding on this type of tool. This saving in diamond wheel consumption and costs is an important reason so many manufacturers and metal working shops have standardized on Buxite wheels for their tough grinding operations.

### ADDITIONAL ADVANTAGES OF BUXITE WHEELS

Every feature of Buxite wheels contributes to faster production and lower piece cost on grinding operations involving super-hard tool steels. Faster, cooler cutting action, longer tool life, longer wheel life and reduction or elimination of diamond wheel consumption result in greatly lowered costs. If our representative has not called recently, write direct to us for additional information and money-saving facts.

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Exclusive Suppliers of BUXITE Grinding Wheels



## CENTERLESS GRINDING WITH A

# *Cammed Regulating Wheel*



Consistent accuracy and continuous maximum production results over a long period of time with a cammed regulating wheel. Further, it is not necessary to accelerate and decelerate the heavy mass of the slides and wheel housing. Little wheel wear occurs on the section of the regulating wheel which brings the work to the desired dimensional accuracy.

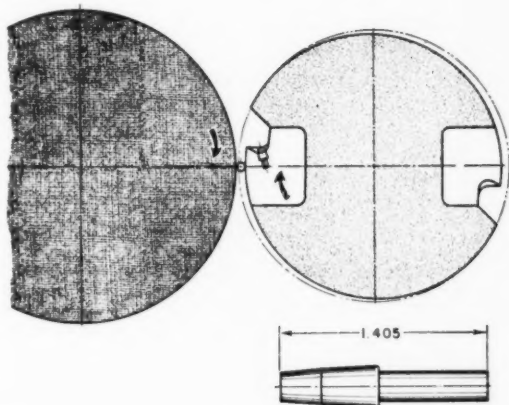
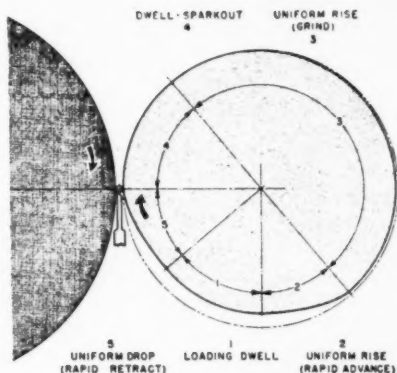
**C**ENTERLESS grinding has, for years, employed either the thrufeed, end feed, or infeed method of advancing the work as it is ground. Now, a different principle is being successfully applied to certain types of work. By truing the periphery of the regulating wheel in the form of a cam, as illustrated in the sketch, figure 1, a rotary infeed effect is obtained. **No slide movement** is necessary to feed the work to the grinding wheel.

Another application of this principle is illustrated in figure 2. Hard rubber feed tips for fountain pens are ground at the rate of two pieces per revolution of the regulating wheel. Identical cam shapes are trued on the two sections of the regulating wheel as shown in the sketch. Notches in the metal inserts provide a simple but effective means whereby the finished pieces are ejected by gravity into the disposal chute as indicated in figure 3. This design is primarily useful when parts of small diameter and short length are to be ground.

The rotary infeed principle has also been applied to the centerless grinding of other parts including

automobile valve stems and a variety of studs and bolts. A set-up for grinding bolts is shown in figure 4. For this job a regulating wheel with one notch is used. Several other interesting examples are shown in figures 5, 6, 7 and 8.

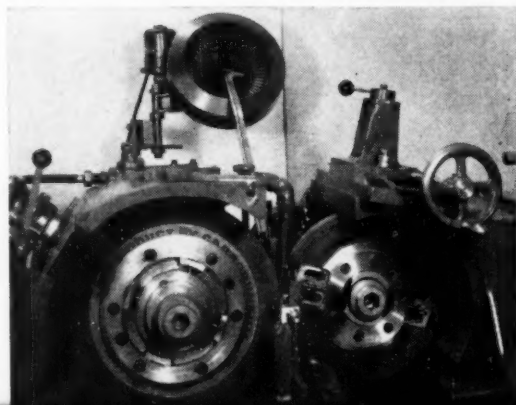
When the rotary infeed method is employed, a fixed relationship exists between the grinding wheel and the regulating wheel at all times because the slides on which the regulating wheel housing is mounted are locked in position. This leads to consistent accuracy and continuous maximum production over long periods of operation. Furthermore, faster cycles are often possible because it is not necessary to accelerate and decelerate the heavy mass of the slides and wheel housing. Another point of interest is that little wheel wear occurs on the section of the regulating wheel (dwell and sparkout, figure 1) which brings the work to the desired dimensional accuracy. The initial punishment always affects the same section of the wheel and takes place before the work reaches the finishing section. Therefore, the reg-



**Figure 1 (Top).** Sketch showing position of cammed regulating wheel at end of grinding cycle. Work pieces are loaded and unloaded at low section of wheel.

**Fig. 2 (Middle).** A double cammed regulating wheel with notches for ejecting the work.

**Fig. 3 (Left).** Grinding hard rubber feed tips on a Cincinnati Filmatic No. 2 centerless. Two pieces are finished at each revolution of the regulating wheel. An automatic loading device of the rotary gravity feed type is used.

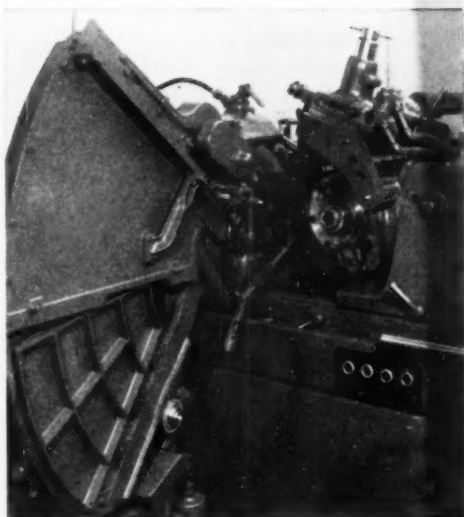


**Figure 4. A Cincinnati Filmatic No. 2 centerless grinder with cammed regulating wheel. One notch is provided for ejecting the finished bolts which are loaded by the hopper. The O.D.'s of  $\frac{3}{8}$ " connecting rod bolts are being ground. Hopper attachment is a standard unit.**

• • •

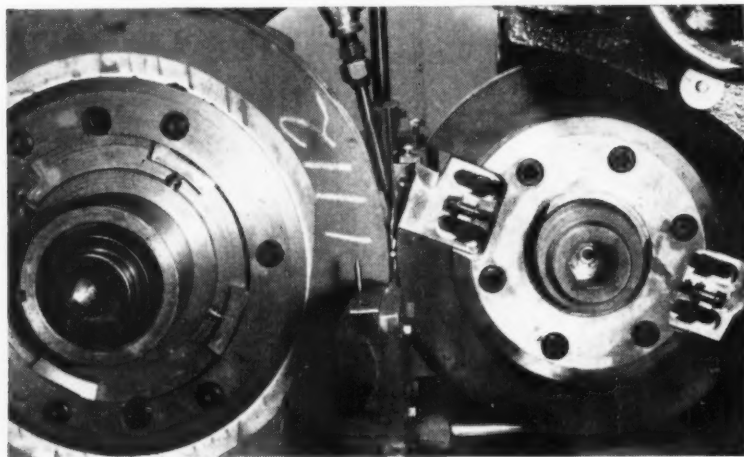
ulating wheel lasts longer between dressings and it is easier for an operator to maintain size and finish on long runs. Cammed regulating wheels are trued on the machine to the desired cam shape. As indicated in figure 2 they may be trued straight or to the profile of an irregularly shaped part.

From the foregoing description it should be understood that the rotary in-feed principle requires accurate timing in order to load and unload the work. With the regulating wheel rotating at a constant speed, these functions must be performed at the proper angular position of the regulating wheel. To accomplish this purpose, an automatic loading device must be provided.

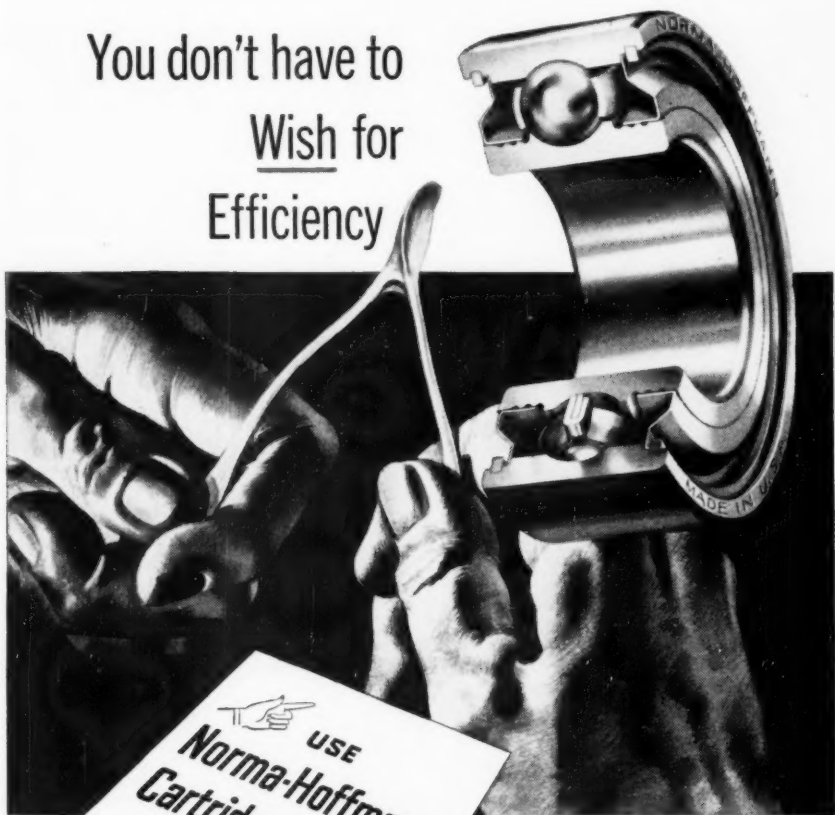


The design of the automatic loading fixture will, of course, be governed by the size and shape of the work piece. Long slender parts such as twist drills are being successfully handled by magazine type fixtures. This employs a

**Fig. 5. No. 2 centerless grinder tooled up to grind 30 caliber cores.**



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**Cartridge Bearings**

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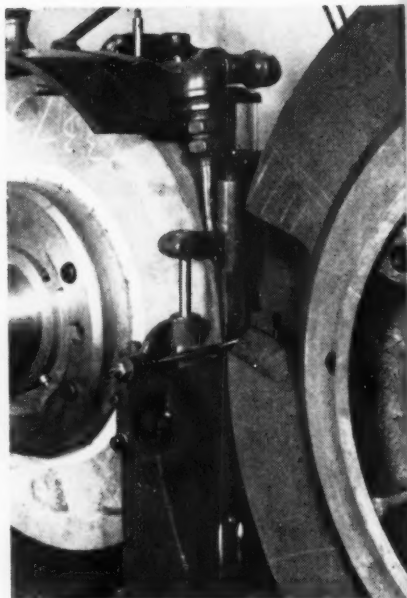
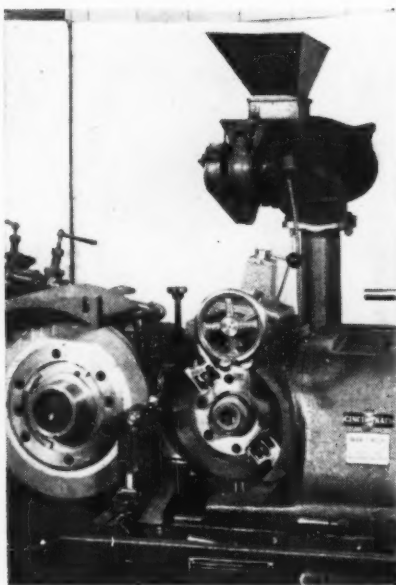


Fig 6 (Top left). An overall view of the machine in figure 5, showing loading mechanism. Fig. 7 (Top right). Same type of equipment grinding 50 caliber cores at the rate of 20 per minute.

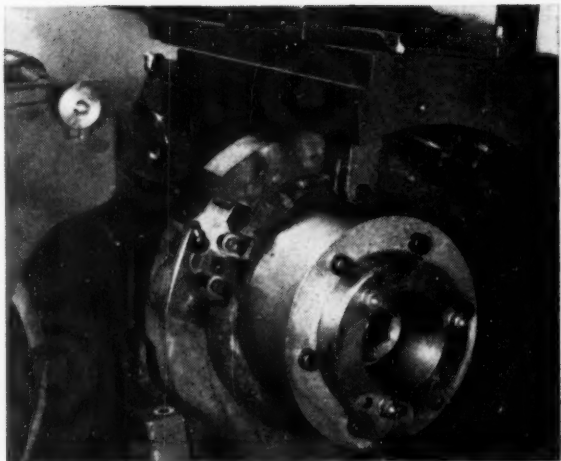
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hydraulically operated pusher. Headless parts, especially those which do not require selection end-for-end, can usually be fed by gravity from a rotary type hopper like the one shown in figure 3. When this type is em-

ployed, the gravity feed chute is usually arranged to deliver the parts to a shuttle type fixture which inserts them one at a time between the wheels. Figure 4 illustrates the Type B Feedmatic hopper which is used to handle headed

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OPEN <b>Plain Type</b>	<b>CONTINUOUS HINGES</b>			<b>Offset Type</b> OPEN
<b>AUTO MOULDING &amp; MFG. CO.</b>				
<b>1110 E. 87TH ST. CHICAGO 19, ILL.</b>				
<b>SPECIFICATIONS:</b> Open Width $\frac{1}{8}$ " to 6" Gage Material .040 to .125 Pin Diameter .101 to $\frac{1}{16}$ " Lengths to 120"				
<b>THREE-FOURTHS OFFSET.</b>				
<b>SEMI-OFFSET</b>				

Fig. 8. Cincinnati No. 2 centerless grinder, with cammed regulating wheel equipment for grinding connecting rod and fly-wheel bolts. The latest type of regulating wheel truing attachment for the cam trued wheel is shown.



parts such as connecting rod bolts. The automatic loading devices are timed either electrically or mechanically by

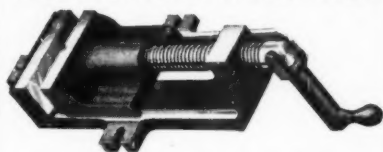
means of a cam mounted on the end of the regulating wheel spindle.

Ejection of the finished part is, of course, taken care of automatically when a notched wheel is used. However, if the part is long and slender, ejection by means of a notch may not be feasible and some external means of ejection must be provided. One of the most positive methods utilizes an ejector operated pneumatically or hydraulically. This function is also controlled by the cam mentioned in the preceding paragraph.

As presently used on the Cincinnati No. 2 Centerless Grinding machine, the rotary infeed method is limited to work pieces approximately 6" in length and  $\frac{3}{4}$ " in diameter. Within these general limits and when properly engineered on jobs to which it is applicable, the rotary infeed method has a definite place in the wide field of centerless grinding. (The End).

(Photos courtesy of Cincinnati Grinders, Inc.).

## YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Opens inches	Weight Pounds
1D	3 $\frac{1}{2}$	3 $\frac{1}{4}$	12 $\frac{1}{2}$
2D	5	5 $\frac{1}{2}$	23

Do you need a vise of ANY type?

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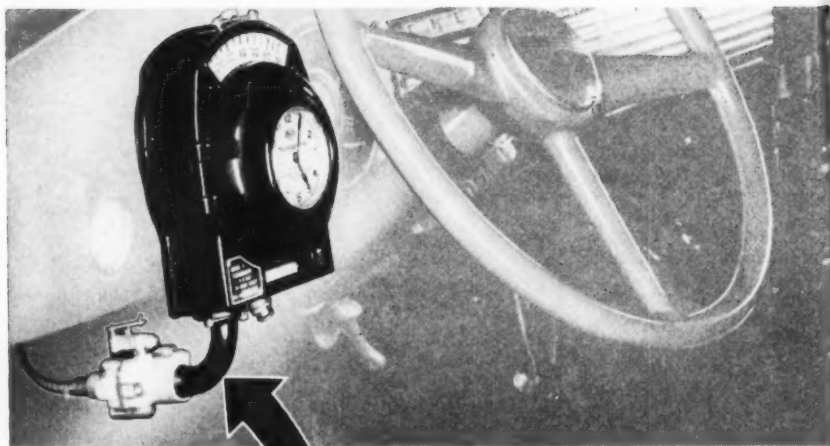


Photo courtesy of Sangamo Electric Company Springfield, Ill.

## A little 3 1/2" flexible shaft licked this angle drive problem

The Tachograph, above, is used on commercial vehicles to make graphic records of vehicle speeds, miles traveled, stops and engine running time. It is driven by the speedometer drive shaft through an adapter.

Originally the 90° turn from the adapter to the Tachograph was made through gears. But, the friction load imposed by the gear box and the Tachograph in cold weather caused a number of speedometer shaft failures.

This was remedied by replacing the gears with a 3 1/2" S.S.White flexible shaft running in a 90° steel elbow, as shown above. The manufacturer says, "Complaints of broken speedometer shafts have been negligible since adopting the flexible shaft, which has been used on many thousand Tachograph installations."

Think of S.S.White flexible shafts next time you are faced with an angle drive problem.

### WRITE FOR THIS FLEXIBLE SHAFT HANDBOOK

It contains 260 pages of facts and data on how to select and apply flexible shafts. Copy sent free if you write for it on your business letterhead and mention your position.



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THE S. S. WHITE DENTAL MFG. CO. DEPT. H, 10 EAST 40th ST., NEW YORK 16, N. Y. —



FLEXIBLE SHAFTS AND ACCESSORIES  
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## Broaching Cylinder Heads With Single Point Carbide Tipped Tools

Broaches, built almost completely of single point carbide tipped tools, (finished teeth are solid carbide blades) are now used to broach all four sides of grey cast iron cylinder heads at the engine plant of one of our largest automobile manufacturers.

These special broaches—using single point carbide tipped tools for roughing and solid carbide blades for finishing—were developed primarily to reduce the maintenance and grinding costs incurred with conventional high speed steel broaches, and to overcome the trouble caused by hard spots in castings.

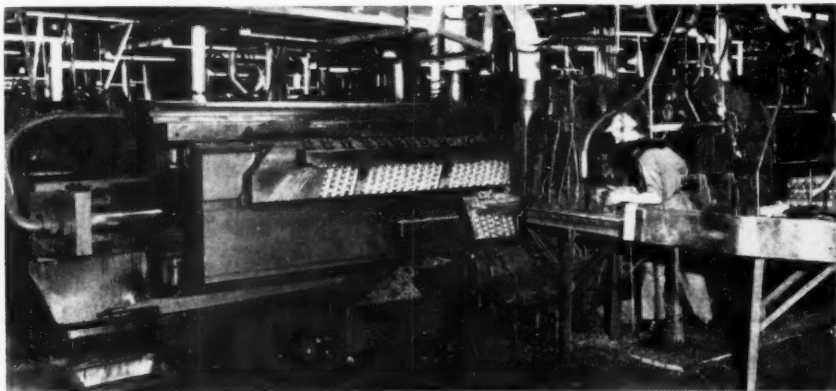
There are four broaches mounted in opposed pairs on the machine columns of a horizontal hydraulic push broaching machine, figure 1. Each pair of broaches consists of a main broach for broaching one face of a cylinder head,

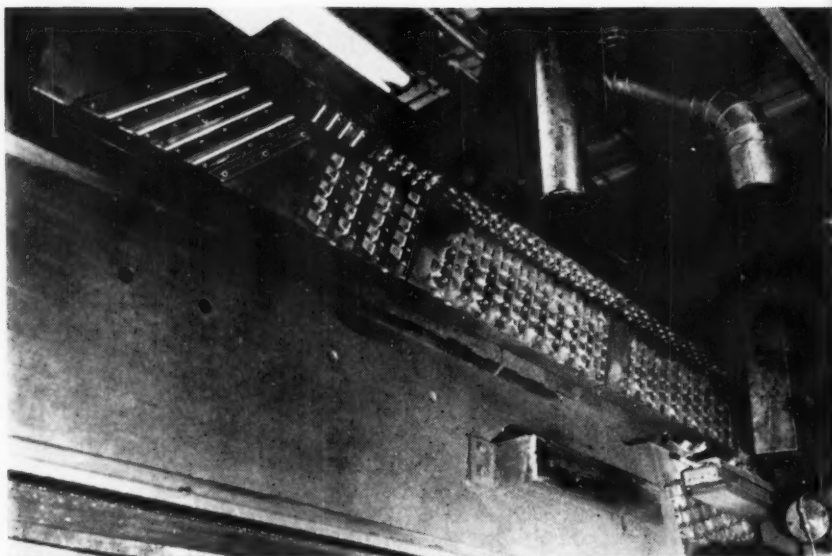
and a rail broach, figure 2, for broaching one side of the casting; thus, in a single back-and-forth sweep of the machine, the top, bottom and two sides of a cylinder head are finished.

Main and rail broaches are practically identical in construction. Major differences are that the main broaches are in four sections; rail broaches in two sections. There is also a slight difference in size of the single point tools used. Total length of each broach is approximately eleven feet. There are 153 single point tools used in each main broach. Tips are of Carboloy Grade 44A.

Each main broach has four solid carbide finishing blades, each blade measuring  $\frac{1}{4} \times \frac{3}{4} \times 11$ ". Finishing blades on rail broaches are correspondingly shorter. Finishing blades are held in place with steel wedges and socket head

Fig. 1. Use of single point carbide tools for roughing and semi-finishing, and solid carbide blades for finishing in this uniquely designed broach has increased between-grinds life more than twenty times over formerly used conventional broaches and has greatly simplified maintenance. Each main broach is composed of four sections, each rail broach of two sections. Broaches are approximately eleven feet long. There are 153 tools in each main broach.





**Fig. 2.** The larger broaches are used for machining the two faces of the cast iron cylinder heads. Rail broaches, of similar design to the main broaches, machine the two sides of the castings. Broaches are clamped onto the machine columns.

screws, see insert in sketch, figure 3. Blades are of Carboloy Grade 883.

Broach bodies are of boiler plate. The backing plates, one for each cross row of single point tools, fit into slots machined into the broach bodies and are fastened to the bodies with screws. The "stop" of the broach is obtained by variations in the height of the backing plates. Total depth of cut for each broach is approximately  $\frac{1}{8}$ ". The broach bodies, complete with single point tools and finishing blades, are fastened to the machine columns with clamps.

Rows of holes for retaining the single point carbide tools used for roughing and semi-finishing are machined in the broach bodies. The tools are set square in the body, but staggered as shown in the sketch, figure 3.

Tool shanks are 1" square in the main broaches;  $\frac{3}{8}$ " in the rail broaches

To assure easy entrance of the cutting edge of the tools into the metal being broached, tool tips are set at a  $20^\circ$  shear angle. End relief angle is  $6^\circ$ . Back rake is neutral.

To lock tools in the broach bodies, a screw which can be reached from the surface of the broach is used, see insert in sketch, figure 3. This screw tightens against a recess milled in the tool shank. Individual adjustment of each tool for length is obtained with an adjusting screw set into the end of the shank. See insert in sketch, figure 3. This screw bottoms against a back plate, which automatically sets tools for height.

### Broach Maintenance

It is not necessary to remove the broach holder for sharpening individual tools. Use of single point tools

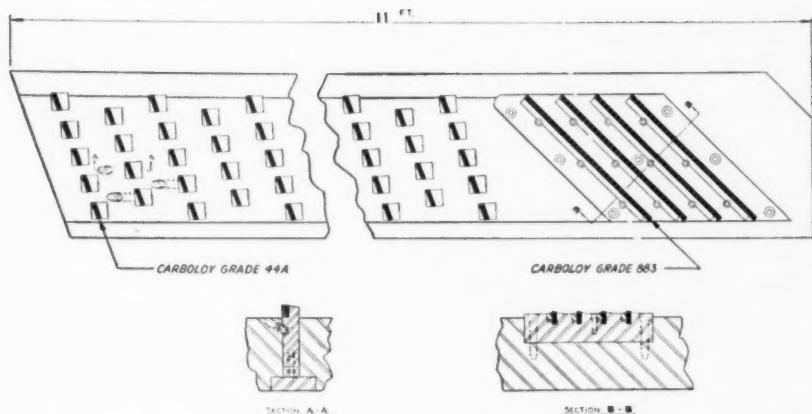
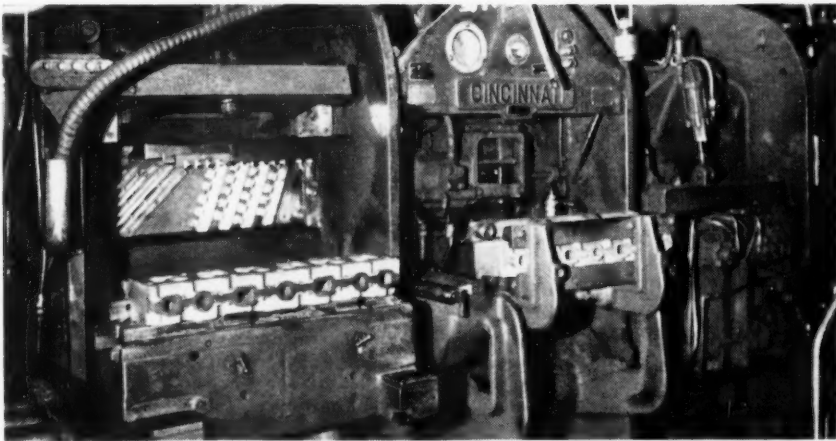


Fig. 3. Sketch shows construction of the broach bodies. Section AA shows how single point roughing and semi-finishing tools are adjusted for height and locked in place. Section BB shows methods of holding finishing blades of solid carbides.

makes it possible to replace any worn tools with sharp tools which are set to the required height by means of their individual adjusting screws. Worn

tools are reground free hand and placed in stock to be used as required. Since step per tooth is taken care of by the backing plates, tools are all of iden-

Fig. 4. Work handling is semi-automatic. The broaching machine has two broaching stations. In each station one face and one side of a cylinder head are broached by a single sweep of the broach. Six and one half pounds of chips are removed from each casting by a single back and forth motion.





**Fig. 5. Finished broached cylinder head. Note uniformity and accuracy of surface. Also note lack of break-out around combustion chamber areas. Production is 500 units per eight hour day, with one man operating the broaching machine. To date, the broach has averaged more than 65,000 castings between grinds.**

tical over-all length from tip to bottom of adjusting screw. Thus, only one fixed gage is necessary to pre-set all tools after grinding, and only a small number of "replacement" tools need be carried in stock to service the broach. Carbide finishing blades are removed as a unit and sharpened on a broach grinder when necessary.

### **Broach Performance**

The broach currently being used has machined 65,812 castings on the Top and Push Rod Rail sections; 56,603 on the Manifold Rail section and over 110,000 on the Contact Face section before resharpening. Average life between grinds of broaches formerly used was some 3,000 units. Each eleven-foot broach then had to be removed from the machine and resharpened on a surface broach grinder. Grinding the high speed steel broaches required the service of three operators for eight hours each; changing the broaches required 2½ operators for two hours—a total of twenty-nine man hours. Thus, the new broach based on machining 65,000 heads

has already eliminated 628 man hours of service time, plus the lost production while the broaches were "out".

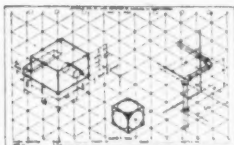
This broach set-up permits any necessary removal of single point tools in a matter of minutes, as against hours required to remove and resharpen a section or more of the conventional broaches previously used. Further, the broach cuts through scale or hard spots in castings without nicking or burning the blades. The broaches give a flat, smooth surface with no crumbling of the metal around the critical edge of the combustion chamber.

### **Broaching Cycle**

The rough casting, weighing approximately eighty-one pounds, is placed in the first (or lower) broaching station on the right hand side of the machine, see figure 4. A single sweep of the broach machines one face and one side of the cylinder head. Chips fall into a trough at the bottom of the machine and are pushed into a container at the end by the stroke of the broach.

The casting is removed from this station and placed in the automatic hoist in the center of the machine. The hoist raises the casting up to the second broaching station, simultaneously turning it over into correct broaching position. The semi-machined casting is then clamped into place, and the remaining face and side are broached by the back sweep of the broach. The finished broached casting, figure 5, then slides into the gravity roller conveyor.

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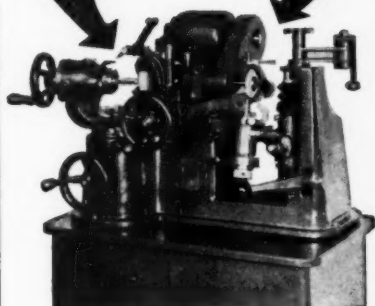
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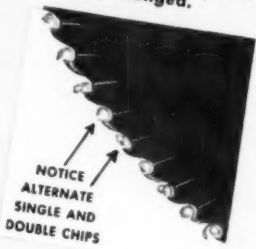
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# Letter from England



Written for the **MACHINE** and **TOOL BLUE BOOK** by Robert Hutcheson, Editor of **MACHINE SHOP MAGAZINE**, London, England.



Under the terms of the European Economic Co-operation Scheme Great Britain submitted her programme last September and this has just been made public. The plan covers a four year programme and covers matters such as the use of man power, the rationing of food and other necessities, sales promotion abroad and the stabilisation of wages. One of the main objects set out in the programme is the maintenance of sterling as an international currency, as a measure for the promotion of international economic stability. Attainment of this object depends upon maintenance of the sterling area gold and dollar reserves. Plans are set out for an increase in agricultural output by fifty per cent and steps are to be taken to spend money on plants in the main branches of industry; namely, agriculture, iron and steel, coal, shipping, electricity, oil and chemicals.

\* \* \*

According to a report published by the Society of Motor Manufacturers and Traders, your country is now Britain's greatest overseas market for agricultural tractors and motor cars. During the first nine months of 1948, 9,482 tractors were sent to the United States out of the export total of 47,000. During October a total of 19,000 motor cars were exported and 2,700 of these were sent to your country.

An interesting development in British motor car manufacture is the rust proofing of car bodies by a process that is being

carried out by Fisher and Ludlow Ltd. in the manufacture of Standard Vanguard bodies. The body and chassis complete is passed through cleaning and processing tanks, the process being one of phosphating. After this the assemblies are dried, painted with a primer and then baked. The treatment takes about 1 $\frac{3}{4}$  hours.

Lord Nuffield, who became famous as head of the Nuffield Organisation building motor cars, is perhaps equally well known for his philanthropy. Lord Nuffield's most recent gift has been that of £250,000 to the Royal College of Surgeons of England. This is intended for the promotion of research and education in the science of surgery and to give increased facilities and amenities to young surgeons and especially those who come from overseas to undertake advanced studies.

A few days ago the Austin Motor Company held its annual general meeting when the chairman and managing director, Mr. L. P. Lord, outlined the company's work over the last financial year. During the year the value of vehicles and spares sold overseas amounted to £18,000,000 and this included products to the value of £12,000,000 that went to the United States and Canada. The company's financial year ended in July and a batch of cars that were ready to leave the works two weeks ago brings the exports to the North American Continent up to £22,000,000.

Two weeks ago Britain's biggest helicopter made its first flight. This is the Cierva Air Horse which has three rotors driven by a Merlin engine. This aircraft was originally designed for the spraying of crops in order to eliminate pests. The aircraft is designed to carry a load of about three tons and will accommodate a crew of two, and twenty-four passengers. A helicopter of this type can be employed for military purposes as well as for passenger and freight carrying and we understand that it can cruise for about two hours at a speed of 116 miles per hour.

I have just returned from a short tour of several of the engineering establishments in East Anglia. East Anglia comprises our counties of Norfolk, Suffolk and a part of Essex and is a district well known to many Americans who manned the aircraft stations that were established there during the war. This area is the centre of the rapidly growing sugar beet industry. Sugar beet forms a substantial part of the agricultural activities and sugar is extracted from it at various centres in the area. The industry was actually established

there about thirty years ago but more recent years have seen its rapid development which shows every sign of increasing and, as is natural, a certain amount of the engineering capacity of East Anglia is being devoted to the industry. One old established firm for instance, Cocksedge & Co. Ltd., of Ipswich, have embarked on this work and it is interesting to note that whereas the earlier plant in the sugar beet factories came from Germany and Czechoslovakia the latest plant to be installed is of local manufacture and, furthermore, locally-built sugar beet plant is being installed in various European countries.

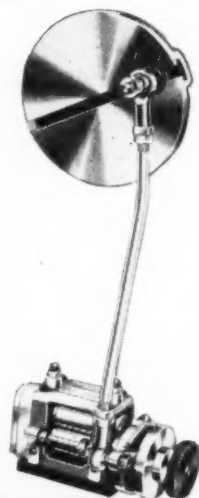
A new step forward in British television was made yesterday when practical cinema television was established. In a cinema just outside London performances were viewed on a 16 ft. by 12 ft. screen and it is reported that the pictures were as good as most of those obtained on the domestic television set but not quite up to the standard of those obtained by ordinary cinematographic projection. Two transmissions were viewed, one from the B.B.C. studio at Alexandra Palace, which is

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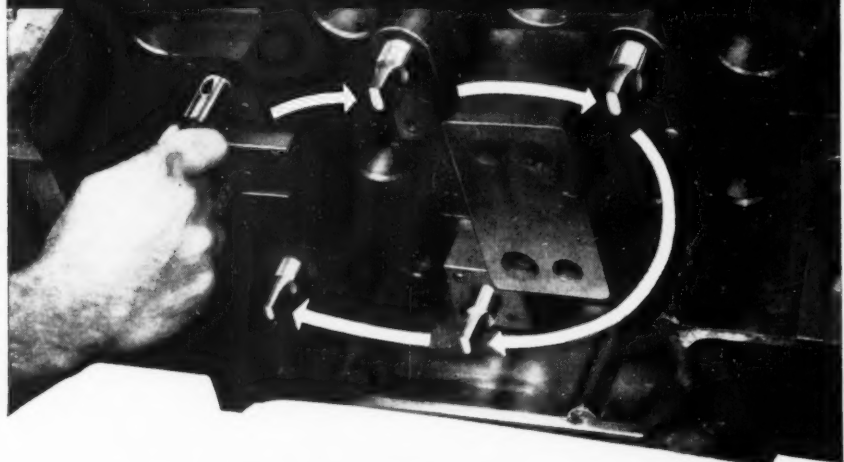
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eighteen miles away, and the other from the Rank transmitter which is at the Crystal Palace, a distance of six miles from the cinema.

Another innovation in cinematograph technique is a development at Pinewood studios of the "back projection" method of providing a background to a scene. According to this new method the entire background is photographed before acting commences and is projected on to a screen in the studio in front of which the artists perform. Actual scenery and other objects which the actors must touch or use are the only real objects used on the set. It is stated that a perfect illusion is obtained and that a saving in time and expense of about 45 per cent is possible. A considerable amount of equipment is needed for the carrying out of this new technique and this has been made in this country.

The silver cloud or the dark cloud, according to one's point of view, hovers over the steel industry, but the industry continues with its development. The Steel

Company of Wales has placed contracts worth half a million pounds for rolling mill equipment and ancilliary plant. This is intended for rolling silicon steel up to 42 ins. wide at speeds up to one thousand feet per minute. The firm who received the order, The Davy and United Engineering Co. Ltd., of Sheffield, received a somewhat similar contract worth one million pounds a few months ago.

The British motor car industry has been alive to the need for co-operation and some measure of standardisation within its own sphere as a measure for the promotion of increased production. The motor car and commercial vehicle builders are to strengthen the liaison between themselves and the suppliers of their materials and to make every effort to assist those who supply them with raw materials and equipment. This involves putting at the disposal of such firms technical and administrative facilities. Six motor car manufacturing firms, namely, Austin, Ford Nuffield, Rootes, Standard and Vauxhall, have an arrangement for the use of common accessories and components. This in itself will constitute a considerable measure of standardisation that should enable components and accessory manufacturers to step up their production, and if the number of types of components and accessories is reduced their manufacture should be done on more economical lines. The Society of Motor Manufacturers and Traders has formed a Production Efficiency and Standardisation Committee to assist in the carrying out of the scheme of co-operation which is being fostered in the trade.

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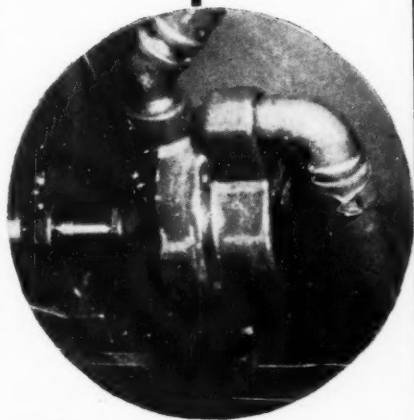
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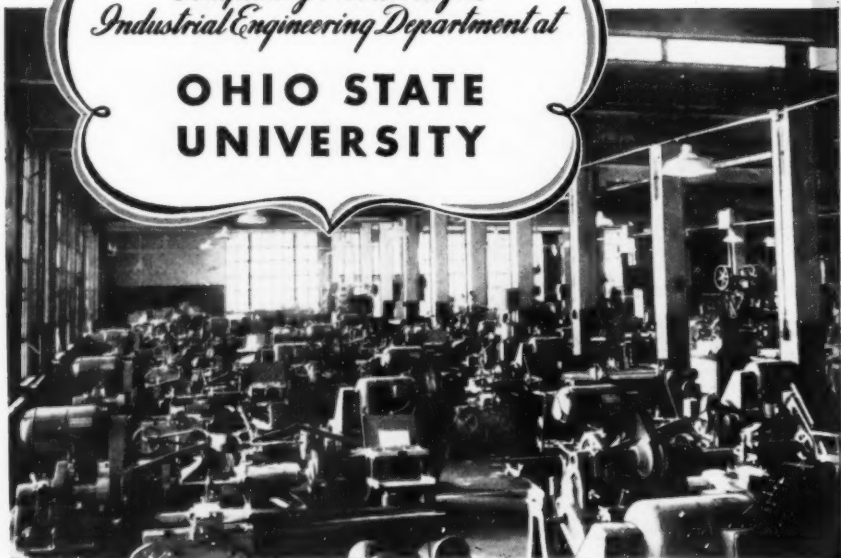
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**Lecture No. 10**  
**THE ECONOMICS OF INSTALLATION**

by

**James C. Hebert**  
Sales Manager, Jones & Lamson Machine Co.

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We must sell more machine tools, not only to assure our livelihood, but to safeguard America against industrial stagnation. We must sell the economics of machine tools; must quote dollar and cents facts and bring home to every prospect that machine tools are the World's Best Investment. There is a large market for machine tools. This market has not been convinced by machine tool builders that modern machine tools are of prime necessity in to-day's manufacturing establishments.

The MACHINE and TOOL BLUE BOOK is happy to present to its readers the complete lectures delivered at the Sales Refresher Course at Cornell University, July, 1948. The course was sponsored jointly by the National Machine Tool Builders' Association and the American Machine Tool Distributors' Association. While lectures deal primarily with the selling of machine tools the fundamental sales principles can be adopted profitably by the manufacturers of general industrial products. The editors thank the NMTBA, the AMTDA and Cornell University for their cooperation in making this material available to their readers.

**THE ECONOMICS** of Installation covers a very broad subject, and I am taking the liberty to go very far afield. This subject is one that can be expanded to any proportion within your imagination. Machine tools form the basic industry of the world, and are the only things without life that will reproduce themselves. Lack of modern machine tools can ruin a nation. If you have not read the booklet, *Technological Stagnation Of Great Britain*, you should do so. This booklet, with a little imagination, will give you a very vivid picture of how a nation can deteriorate in this day and age through the lack of an efficient industry.

England at one time was the master of the textile industry. They allowed their equipment to deteriorate, designs to become obsolete, and as a result, they have lost the majority of their textile business. If you travel through the Midlands today you will find scores of once thrifty textile mills standing idle and full of obsolete textile machinery.

The production of British automobiles, prior to the war, was limited by the use of obsolete machines and methods.

A nation can grow stagnant and become obsolete, not only in their manufacturing facilities, but in their thinking. By taking everything out of industry as far as

earnings are concerned, they will soon find themselves in a position economically where it is impossible to quickly and efficiently recover.

We all know what took place in France from World War I to World War II. The government was not stable, thinking was not clear, and everyone was striving for personal gain politically, and otherwise, and as a result their industry was allowed to deteriorate to a point where they were not in a position to produce the equipment required to modernize and equip their army, and we all know the final results.

Gentlemen, machine tools are the basis for our National Economy, National Defense, and basically are the fundamentals of our standard of living. Don't think of selling machine tools as just another job, because we, as an industry, and we as machine tool salesmen are rendering a service to this country that is much greater than just selling machinery to obtain a livelihood for ourselves and our industry.

I am particularly pleased to have this opportunity to give you my thoughts on this subject, and I hope everyone who is here today will take this message away with him and do a selling job when he gets home on his own people and on his



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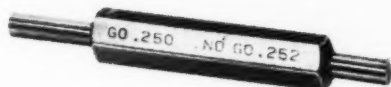
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customers, of what the American Machine Tool Industry means to this country and to the world. We, as an industry, have done a poor job of selling our position in our national economy. What we did during World War II in building machinery and aiding our customers in tooling up the greatest arsenal in the world is symbolic of what our industry can do. We produced from January 1st, 1939 to V-J Day approximately \$4,000,000,000 worth of machine tools. This machinery and the know-how within the industry was responsible to a great extent for an Allied Victory.

We have something to sell, and let's sell it. We hope that the knowledge and suggestions you obtain here at Cornell during these two weeks will broaden your thinking to a point where we can depend on you to do a job of selling to your company and within your community, and among your friends. I guess I am a "nut" on this subject, but we have not started to sell machine tools as an industry from an economic point of view. We have, as an industry, done an excellent technical job of selling. We, as an industry, have been responsible for tooling up the greatest mass production system in the world but I still repeat that I don't think we have

started to sell from an economic point of view. I am convinced that if we can devise ways and means of proper presentation of the economic side of the sale of machine tools that we can double our industry sales.

We recently had an inquiry from one of the largest automobile manufacturers in this country, and we sold the operating personnel. The request was made to top management for the appropriation and it was refused on the basis that they could not write off the total amount of the cost of installation within a period of one year. This is absolutely absurd and is the start of Technological Stagnation. This particular company should spend today at least \$100,000,000 to replace obsolete capital equipment. In walking through their plants the production on every job you look at, with a very few rare exceptions, could be materially improved through the installation of this equipment. Here is another situation we found within the same corporation. In the year of 1947 they spent in direct labor alone \$136,000 for the production of the required quantity of a particular part. We offered them four machines that would cost them approximately \$100,000 and their direct labor for operating these four machines to obtain the required production would

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W. H. Moreton

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**INDIANAPOLIS 4, I.**  
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Machy, Co. of Ind.  
Chamber of Commerce  
Building

**KANSAS CITY, MO.**  
Blackman & Nuetzel  
Machy, Co.

**KNOXVILLE 5, TENN.**  
Murrin, The W. S. Co.  
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Machy, Co. Ltd.  
2026 Santa Fe Ave.

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Machy, Co.  
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Keller, George Machy, Co.  
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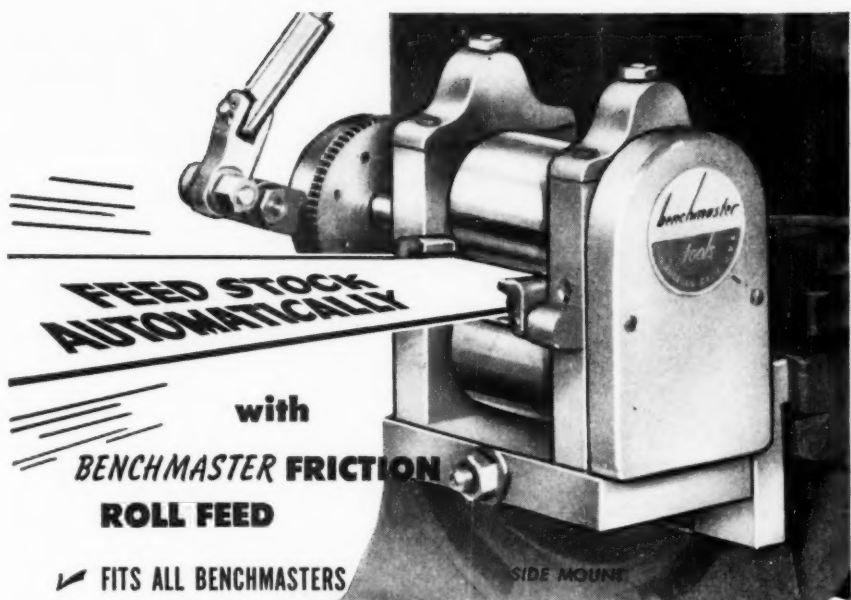
**SYRACUSE 2, N. Y.**  
Briggs, C. H. Mach.  
Tool Co. Inc.

Onondaga Hotel Bldg.  
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Rudel Machinery Co., Inc.  
7 South Main St.

**ABRASIVE MACHINE TOOL CO.**  
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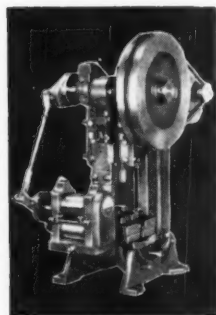
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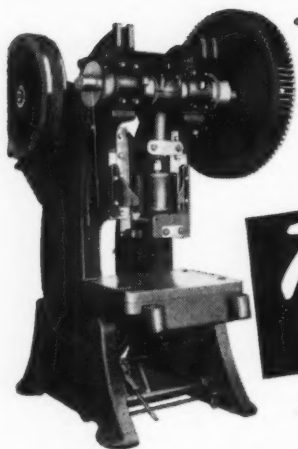
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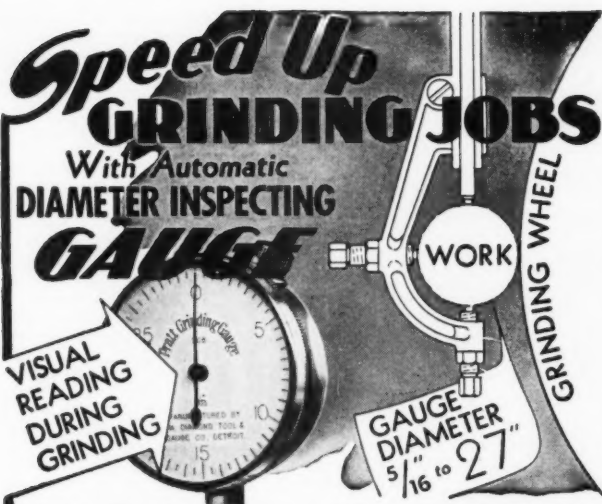
Gentlemen, the woods are full of prospects of this type, but before we can expect to sell our products in greater quantity we must sell top management and the people holding the purse strings of industry.

There has been some good thinking done within the last year on the economic analysis of the purchase of machine tools.

down many of the barriers that are retarding machine tool sales at this time. I expect to have a copy of Mr. Terborgh's manuscript in the near future, and from talking with him and his associates I understand that his book will explain in detail the short-sighted policy I have illustrated earlier in this talk, of a manufacturer requesting that new machine tools pay for themselves within one year.

The task we have ahead of us is not an easy one, because we will have to sell everyone from the master mechanic or superintendent to the president and the board of directors in industry, our

Mr. George Terborgh, who is connected with Machinery and Allied Products Institute in Washington, has written a book that is about ready to go to the printer, which I hope will serve as a bible and a guide on this subject. Mr. Terborgh's book will be a most comprehensive study of this problem. It is going to be a very laborious task to absorb what Mr. Terborgh has written, but I think and feel confident that this book will provide a fund of information that will be of value to us as an industry and to our national economy, because our politicians, bankers, heads of industry and our economists will have available a book that will explode a lot of short-sighted policies that now prevail. This book is something we will not be able to use directly in our sales work, but we will be able to take from this book basic policies that will help us break



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you should be allowed to do so. One of the most outstanding features in building up the German industry prior to World War II was free depreciation.

The Canadian Government will allow their manufacturers to depreciate capital goods over a period of five years, and over a shorter period in certain special cases.

It is the policy of the Treasury Department to depreciate machine tools over a period of 15 to 25 years. The average is 20.7 years.

Another sad part of depreciation is that if you take your depreciation on machine tools over the seventeen years, at the end of the seventeen years your depreciation will not equal replacement cost of your existing equipment. Machine tool prices as a whole have increased from fifty per cent since 1940, and unless this whole picture is changed covering depreciation and our economic psy-

chology, we are headed straight for Technological Stagnation.

I have tried to cover a lot of overall long range thinking, but now let's get back to the problem of selling machine tools and justify the purchase in terms of dollars and cents, or earnings per dollar invested.

The Sales and Service Committee and the Public Relations Committee of the National Machine Tool Builders' Association have spent a lot of time on this subject. We have in the making a folder that will be printed for distribution to top management and the financial people in

bankers and our politicians.

Depreciation is an important factor in the sale of capital goods. Our industry has done some excellent work for a number of years with the Internal Revenue Department, trying to get this situation changed. I personally feel we should have free depreciation. I do not believe any National policy can be established that will serve the purpose in all cases, and I cannot see why the Internal Revenue Department should object to it. If you want to depreciate a machine within one year, and pay the penalty, "so what!". If you want to depreciate it in five years

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this country that are directly or indirectly associated with or interested in industry. All of the illustrations are actual cases and have been used to sell a machine tool, or a group of machine tools. These illustrations, although very different in their general make-up, arrive at the same point in the final analysis\*\*\*.

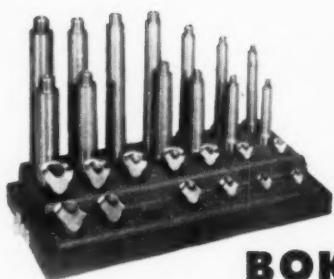
There has never been a time in the history of our industry when we were in a better position to approach the sale of machine tools from an economic point of view. Our labor cost has increased to a point where it is necessary for every customer to obtain the maximum production

should be applied in making an analysis of the savings that can be obtained through the installation of a new machine tool. If a manufacturer completely retooled his plant, and could purchase equipment that would enable him to obtain the same plant output with one half the existing machine tools, then it would be easy to determine the savings in overhead that could be applied against the earnings per dollar invested in the new equipment. Most of us sell spot installations of one, two or half dozen machines.

I hope Mr. Terborgh's book will throw some light on this subject, and that we

per labor hour. The average machine operator earns from \$60 to \$80 per week, so that if you can only double the customer's production through the installation of a new machine you can write off the total investment of a \$10,000 machine tool in direct labor savings alone in a period of less than three years, as illustrated on this chart. In addition to direct labor there are many other factors that should enter into the earning power per dollar invested in machine tools, such as paid holidays, hospitalization, social security, paid vacations and goodness only knows how many fringe items that have to be absorbed by every company, and are all a part of their direct cost of operations.

The subject of overhead is the most elusive factor, because I have not been able to find anyone that could establish a fair percentage of the total overhead in all companies that



**STYLE A**  
for general  
boring

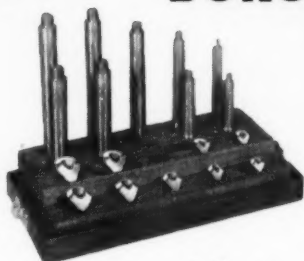


**STYLE B**  
for bottoming  
and facing



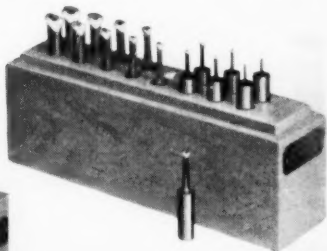
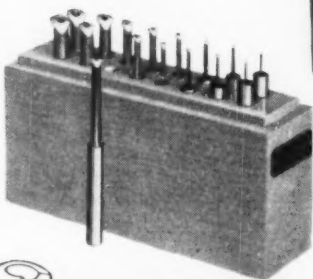
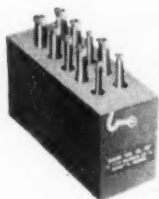
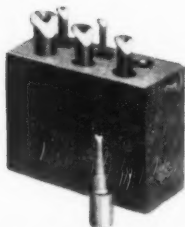
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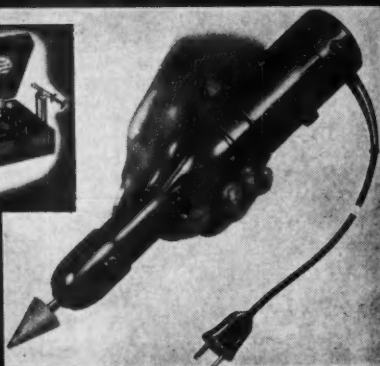
can obtain from the information he has gathered a yardstick that can be used in measuring the percentage of overhead which can be applied to the analysis of the purchase of an individual, or a group of new machine tools. You can readily visualize that if we can apply a percentage of the total overhead in figuring the earnings per dollar invested then we can show much greater earnings on a new machine tool.

A large percentage of the men in this room are actively engaged in the sale of machine tools, and I would like to know by a show of hands how many men are

are actually engaged in the field full time selling machine tools. I would like to know how many men here are working out of their home office and engaged part time in the sale of machine tools. You men that are engaged in the sale of machine tools, either part time or full time, can readily visualize the increased volume of business that you could obtain if you could get your potential customers to appropriate the funds to purchase the equipment you are offering to them that will show them sufficient earnings so the total investment can be written off in three years or less. From the best authorities that I have been able to contact I am convinced that economically any general purpose tool that can be written off in five years is a good investment.

Our industry should adopt this slogan, "machine tools are the world's best investment," and we should shout it from the housetops, publicize it in our newspapers, trade journals, and business week publications, and display it on bill boards or through any other means that are necessary to sell this slogan\*\*\*\*. If you tell people the same thing long enough and often enough you can make them believe it. Our greatest asset in selling this thought and idea is to get people talking about it. This thought must be sold to the men we normally contact, and in addition we must reach the financial minds and the people holding the purse strings of industry in this country and throughout the world. I am not giving

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you gentlemen a pep talk; I am giving you facts that will materially benefit each and every one of us. If we can produce refrigerators, automobiles, radios, agricultural equipment and all of the commodities that are manufactured in this country at a price that will bring them within the buying power of the masses, we can continue our present standard of living and maintain a sound national economy.

There are some enormous untapped markets for all types of consumer goods. Think of India with its 450,000,000 people who require and need everything imaginable.

We are capable of growing and manufacturing in this country from thirty to fifty per cent more than we can consume, and if we expect to maintain a balanced economy and provide 61,000,000 jobs we must have an outlet for this surplus capacity. If our prices continue to soar as they have in the last few years we will eventually find ourselves in a spot where we will have 150,000,000 people in the United States, and we will all be stewing in our own juice. I don't have to tell you the answer to this one. When we reach this point our standard of living will deteriorate so rapidly we will soon be soon be back to the bicycle age.

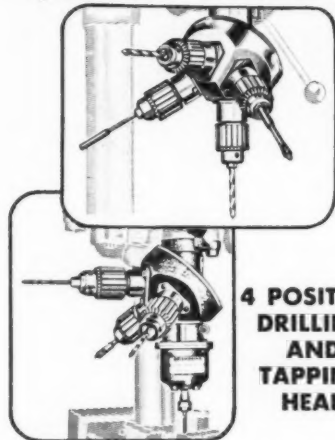
More goods for more people, at a lower cost, is another slogan we should develop and advertise. The present inflationary period could be checked and held stable if we were producing a sufficient volume of

consumer goods so there would not be so many people clamoring for the same commodity and willing to pay any price to get it. When the day comes that we can walk into an automobile salesroom and take delivery of a car off of the floor our whole economic structure in this country will change over night. I am making this statement, assuming all other consumer goods will be in the same relative position as far as quantity is concerned. We must devise ways and means of producing more goods at a lower cost and with less human fatigue. Statistics show that eight to ten men are employed outside of the automotive industry for

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every man that is employed in the production of automobiles, so if we could produce more automobiles with less labor we would be able to reduce the price to the consumer and increase sales and total employment and place our products in a more competitive position on the world's market.

The cigarette industry is a good illustration. There is a very small amount of labor employed in the actual production of cigarettes, but there are thousands of people employed in the merchandising of them.

Further use of high production automatic machinery in the metal trades will not reduce overall employment in this country. We, as an industry, should strive to mechanize our industry to a point where all types of consumer goods can be produced in quantity at a lower cost. The economic analysis of the purchase of machine tools is one of our most effective sales tools. I am convinced that if we can go all of the way and do a selling job on our financial people, who are directly or indirectly associated with industry, we can make a case for enormous investment in manufacturing facilities in American industry.

I realize the task we have ahead of us is not an easy one, but if we spend as much time and energy in applying ingenuity to the sale of our products as we do in the development of our equipment, we will materially increase the sale of the products manufactured by our industry.

Our approach to selling the financial mind on a mass production basis is a new challenge for us, but I am convinced that if we apply ourselves and use the ability we have in our industry we can **SELL THE WORLD'S BEST INVESTMENT.**

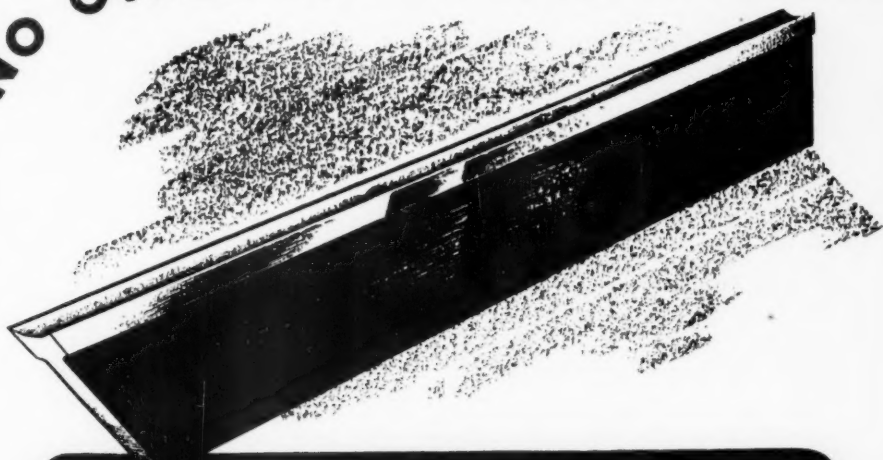
\* Technological Stagnation of Great Britain is published by the Machinery and Allied Products Institute, 221 N. LaSalle St., Chicago, Ill.

\*\* Last revisions of Mr. Terborgh's book are in the hands of the printer. It is expected the book will be ready for distribution in approximately three months. Available from Machinery and Allied Products Institute, 221 N. LaSalle St., Chicago, Ill.

\*\*\* The booklet, The World's Best Investment, is published by the National Machine Tool Builders Association, 10525 Carnegie Ave., Cleveland, Ohio.

\*\*\*\* For a further discussion of this subject see the **MACHINE and TOOL BLUE BOOK**, September 1948, page 153, **Sell The World's Best Investment**, by J. C. Hebert.

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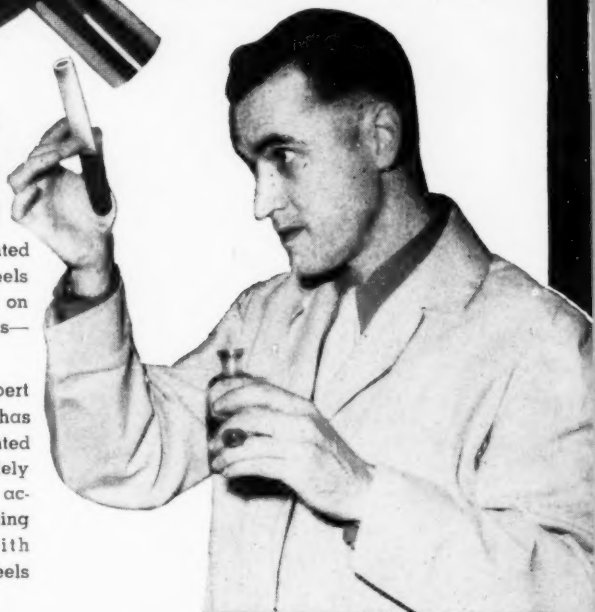


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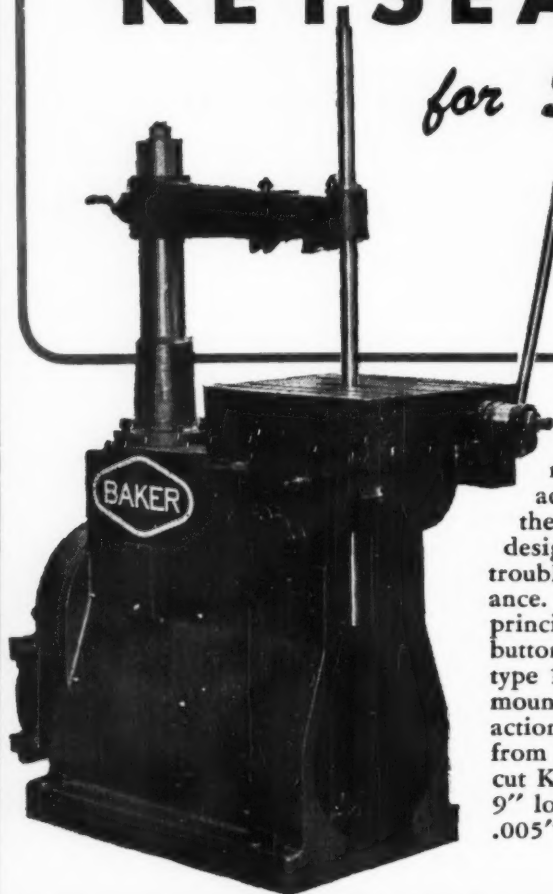
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## Lecture No. 11

### **WHAT SHOULD THE SALES ENGINEER KNOW ABOUT ANY PARTICULAR PROSPECT?**

by

**Robert L. Giebel**

President, R. L. Giebel, Inc. New York

## **GET THE FACTS**

As salesman you must know your customers, their financial status, their products, their policies, markets, business conditions in their particular field. You must know about the prospect's plans, the personality of the company, and most important of all, something about the men with whom you are dealing. These facts are invaluable in getting and holding the prospect's attention and in making him feel that you have his best interests at heart.

Several years ago I sat as foreman of a jury trying a prosperous looking individual for robbery. Two clever lawyers battled it out while I, for one, sat with my ears, eyes, and I'm afraid, my mouth open. Each tried to develop facts or prove the other's wrong or immaterial. They had perfected the art of salesmanship. Their summations were equally effective but in opposite directions.

We, as salesmen, are, in effect, both

the friendly prosecutor and the defense attorney. When we step into the courtroom, our customer's office, we must have all the facts, not only about the product we want to sell, but facts about the company and its representatives. If we do not have certain facts in advance then we must quickly observe them.

Why are these facts necessary? One of the first things we must do is to get the customer's attention. When we have his attention, we must hold it by getting his

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### SCULLY-JONES MICRO-NUTS\*

**You Make "Precision" Adjustments**  
Make really accurate adjustments on Multiple Spindle Machines to .001 in., by scribing a mark at any point on Spindle (see illustration) and turning easy-to-read, calibrated Scully-Jones Micro-Nut in direction required.

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Simply give a quarter turn to set-screw, to lock Scully-Jones Micro-Nuts in place at any location on thread of Adapter.

**For Both Types of Threaded Adapters**  
You can use these low-cost Micro-Nuts on present Adapters with or without set-screw slots.

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Yes, I've even gotten tips out of a Police Gazette I picked up at a Barber Shop. Through habit you should pick up items of interest as you would spot smokestacks in your travels. As far as possible we provide a new salesman with a resume of all past transactions, a list of installations, names of executives and the like, but ask him to use these facts only as a preliminary guide. After he gets past the front door, he must check the facts we have given him and add to them. I suggest you bear in mind that the information clerk generally has a vast amount of useful information on the tip of her tongue. If you treat her with courtesy she will try to be helpful to you.

We must not only know what a prospect makes and how he makes it, but also what the effects of economic, political and social trends are on his products. It is possible for us

interest. How are you and I supposed to know what he should be interested in unless we know what he makes, how he makes it, what his company's short and long-range plans are, and most important, something of the personality of the company and the man who does the final selecting. Successful lawyers make thorough studies of the personalities of the judges and juries who are to try their cases, and present their facts accordingly.

How can you and I get these facts? Sometimes we get tips from a financial paper or, we may pick up an idea from the daily papers, or the Racing Form.

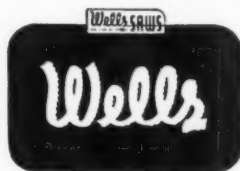
to know more about the trends of a company's business than the executive we interview. If we reach this point, we certainly ought to be able to be of service to him. None of us can hope to live long enough to know "all" about every customer we call on. If every Tom, Dick, and Harry could easily assemble this information, salesmen would be rated at a dime a dozen. All we can do is to try to get the principal facts at the start of our sales effort and then keep adding to them at every opportunity. A salesman who calls on the same customers year in and year out and sells quality

*Looking for ways  
to cut costs?*



**use a WELLS  
METAL CUTTING BAND SAW**

In thousands of plants all over the world, Wells Saws are proving that it is possible to cut metal faster and more accurately at lower cost. This is accomplished through machine design and the principle of continuous cutting. As each tooth does its share of the work, the blade is cutting all the time — there is no lost motion. This means more cuts per day and lower unit cost to you. Three standard models of Wells Metal Cutting Saws are available to meet virtually every need. Use the handy chart below to find the saw you need to meet your requirements and ask your Wells dealer for complete information or write direct.



*Products by Wells are Practical*

**METAL CUTTING  
BAND SAWS**

WELLS MANUFACTURING CORPORATION  
707 COOLIDGE AVE., THREE RIVERS, MICHIGAN

tools can, if he is smart, erect a stone wall around those customers which his competitors will find practically impossible to mount. He must, however, assemble his facts with the idea of being of service to the customer. If his aim is simply to get an order, he will soon fall by the wayside.

Facts will vary with time. What is true today may not be true tomorrow. Facts are of little value unless one is completely familiar with all of the circumstances existing when these facts were recorded. Facts that are important

about one customer may be unimportant about another. We must keep our stock pile of facts up to date.

Besides knowing what a company makes and what the past, present, and future consumer demand for his product is, we must get some financial facts. It is foolish to try to sell a company a machine which we believe he cannot afford to buy. Yet, it is most difficult to decide whether a company is able to make the investment. Their own financial statement, credit references, or a report from Dun and Bradstreet will provide some good preliminary data. However, we can't make a decision on financial statements alone. All of us have had the experience of selling machinery to companies whose financial statements were unattractive and yet got paid for them. We took the gamble because all the facts indicated that their future looked bright. On the

other hand, we've accepted orders from companies whose statements were beyond reproach; yet, they ran into difficulties and we had a hard time collecting the account. We in the machine tool business are very fortunate: I believe the great majority of our prospects buy machines only after they feel sure they can pay for them. Dishonest customers are few and far between; however, they do exist. Often the spirit is willing but the finances are weak.

Accepting an order for a standard machine is generally not much of a

## CUT MILLING COSTS *with* KEMPSMITH STANDARD ATTACHMENTS

### PLAIN INDEX CENTERS

Can Be Used on ANY  
Milling Machine



Kempsmith Plain Index Centers for production and general indexing . . . simplify job set-ups . . . relieve the operator of the necessity of counting or making any calculations. Indispensable in milling taps, reamers, small gears, sprocket wheels, special grooving, etc. Described in Bulletin No. 124.

Kempsmith Standard Attachments broaden the scope of your milling machine . . . lower capital investment . . . save in set-up time.

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# KEMPSMITH

**Precision Built Milling Machines Since 1888**



KEMPSMITH  
ARBORS

in all popular  
sizes or types.  
Adaptable to  
ANY make of  
milling ma-  
chine with  
standardized  
spindle.

apt to be in the same condition.

We have to look for exceptions too. I know of one shop in our territory that looks like a junk pile. The machines have Noah's fingerprints rusted in the ways and its owner could easily get a free bunk in the Bowery. Yet it is a money-maker, and has been, year in and year out. I know of a Hollywood set-up which has the cleanliness of a bake shop, is the last word in system. Yet we would only sell them standard machines on a sight draft basis, and special - purpose machines "cash with order." If the salesman bears in mind at all times that a machine is not sold until it is paid for, he will make an effort to pick up information of value to the credit man and thus avoid unpleasant developments and financial losses.

Generally speaking, I think it is inadvisable to discuss the problems of one customer

gamble, but purchase of a special-purpose machine must withstand a rigorous investigation.

An observing salesman can gain a lot of information by keeping his eyes open while walking through the prospect's shop. I am always suspicious of manufacturers who will not give the sales engineer that privilege. If the shop is orderly, the machines clean and in good operating condition, a salesman can be pretty sure that the company itself is well managed. On the other hand, if it is slipshod, piles of scrap here and there, with no apparent system, its finances are

with another. However, if you are fortunate enough to have two, three, or more competitors in the same general locality, you may pick up facts that will guide you in your dealings with all of them. Your prospect may, in turn, have customers in your territory whom you contact. A few leading questions may produce some valuable information.

The future of a company depends, of course, on the consumer demand for its products. Immediately after World War I there was supposed to be a terrific demand for farm tractors. In the East we seemed to have hundreds of manufactur-

# High Production Milling *Saves Labor... Cuts Costs*

For high production with precision—put the work on Kent-Owens Milling Machines! They're designed for rapid, easy set-up and operation. Rugged . . . with twin-post head mounting that assures balanced load—no chattering. Practical features throughout to help you produce more . . . save labor . . . and reduce costs! Write for bulletin. Kent-Owens Machine Co., Toledo, Ohio.



No. 2-20 Milling Machine  
Table, 42" x 12"  
Table travel, 20"

## KENT-OWENS *Milling Machines*

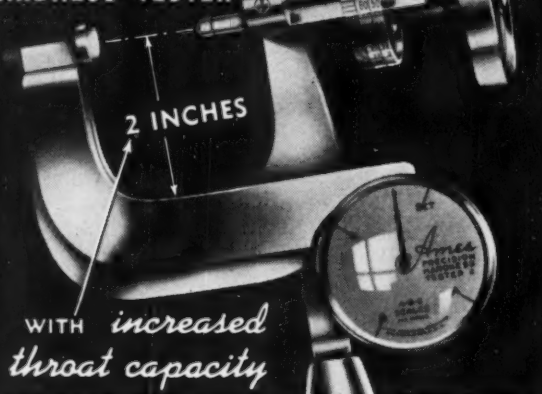
ers who thought they could make and sell the perfect farm tractor. They overestimated both the demand and their ability. All passed out of the picture, some quickly, others after a few years. Gone with them is the sucker's money. Four automobile manufacturing companies started, expanded, and failed in the same period. We passed from that era to the craze for manufacturing oil burners, radios, washing machines and all sorts of kitchen and household labor-saving devices. In each field only a few survived, even though some were financ-

ed by companies who had already been successful in some other field. We are now passing through the television phase and we can be sure there are some startling new developments, real and imaginary, just around the corner. Therefore, I warn you to look over your prospects and try to learn whether their product has merit. Do they know how to manufacture it? Do they know how to sell it? Do they have sufficient capital? Get facts, don't guess!

One of the most important things a salesman must do when contacting a new prospect is to learn who actually does the selecting of the new machines. Titles usually mean little except in very large, well organized companies. I know some purchasing agents who select the capital equipment. They are the first and last word. I know other purchasing agents who are simply rubber stamps. The purchasing agent is

the first man a salesman is apt to meet when he calls on a new prospect, but he must not allow himself to get stymied by that "Iron Curtain." Some place, somewhere in every organization is a man, or men, who really select the equipment. They are the contacts the salesman must make. Big companies have all sorts of committees who have the responsibility of analyzing requirements, quotations, etc. If an alert salesman gets behind those committees, he will learn that there is generally one guiding hand that influences all orders. If the salesman

## The NEW Model 2 *Ames* PORTABLE HARDNESS TESTER



Now a new Ames Portable Hardness Tester with 2" throat capacity (depth and width) for greater range. Tests flat and round stock, tubing and odd-shaped pieces directly in the Rockwell Scales. Anyone can operate to obtain accurate readings. Used by technicians, engineers, inspectors, stockmen and salesmen.

Ames Testers are available in other sizes.

Write for new bulletin.

**AMES PRECISION MACHINE WORKS**  
WALTHAM 54, MASS., U. S. A.

wins the confidence of everyone he meets, some kind-hearted soul will tip him off as to who is who and why.

Years ago I had the responsibility of calling on a big railroad company. We received all of their inquiries, and after we quoted I'd interview the superintendent of motor power, the master mechanic, the superintendent of the shop and various foremen, but always lost the orders. While I had a lot to learn about selling, I knew I couldn't be that bad. I finally learned from a lathe operator the name of a man in the shop who had no title but was considered an authority on machine tools by all his superiors.

turers try to standardize on certain makes of machines, and especially on makes of electrical equipment. There are many good reasons for such a policy, but it is easy to point out why it may interfere with progress. I know of one company which followed that policy so rigidly that they sacrificed increased production believing that their saving in upkeep and inventory would offset the savings in labor and costs. They were wrong, and it took new blood at the top to shake them out of a critical condition. Old operators, equally, resist new designs or models. Department foremen argue for standardization which permits

He was making the actual decisions.

I know another large corporation which has as president a man who worked himself up from a machinist. He insists on selecting the machine tools and, while a salesman must do his missionary work with the foreman, the superintendent, and the purchasing agent, he hasn't a chance of getting the order unless he finishes his job by selling that president.

It has been years since a prospective customer indicated to us that his purchasing was influenced by reciprocity. As far as I know, there are just a few companies in the East who consider reciprocity and even they do not take it into consideration unless all other things are equal. It is not my intention to argue the merits of such a policy, but a salesman should know whether it exists in the prospect's organization.

Some manufac-

## TROUBLE REPORT

Machine Time	15 min.	OK
Set-Up Time	65 min.	NG
Remarks	Spent 15 minutes hunting for arbor spacers! Same on every job!	

Recommendation *Order 2 Sets of De-Sta-Co arbor spacers for each milling machine!* JB

# That's Right!

When machinists waste time hunting for arbor spacers it costs you plenty! A money-saving solution

is to provide an extra set of De-Sta-Co arbor spacers and shims for every milling machine in your shop. Demanded by name for over 30 years, they're the machinists' preference for spacing of cutters, saws and slitters, for shimming gears and bearings and for all machining set-ups. Two sets per machine will save set-up time on your jobs.



ARBOR SPACERS  
Keywayed



SHIMS  
Not Keywayed

De-Sta-Co arbor spacers come packed in standard sizes from  $\frac{3}{4}$ " to 4" I.D., thicknesses from .001" to .125", all with keyway. Handy cellophane envelope contains set of 19 graduated decimal thicknesses. Shims supplied in same sizes without keyway. Specials, thicknesses over .125", available in popular sizes, machined from bar stock, hardened and ground, with standard keyways. Order De-Sta-Co arbor spacers and shims from your mill supply house.

## DETROIT STAMPING COMPANY

347 Midland Avenue

Detroit 3, Michigan

easy transfer of operators. A salesman must know these facts and have his arguments prepared.

Inquiries, oral or written, are just a step in an long expensive sale effort. They should be analyzed intelligently before the proposals are made. The number of orders placed in proportion to the quotations made is quite small. It is relatively inexpensive to prepare a quotation on a standard machine; but single-purpose, or special adaptations, require careful thought by expensive engineering departments. Someone must pay for this service. The salesman should know

from the facts he has accumulated about his prospects whether the inquiry is for the proper size or type of machine. For example, the prospect may inquire for a 20" lathe, not realizing that the modern 16" lathe is as powerful as the 20" lathe made years ago. Six foot radial drills bought after the first World War have no more than the four foot radial drill made today. If the customer does not need reach, perhaps a smaller machine will meet his requirements. If special engineering work is necessary in order to quote, the salesman must have the facts to decide whether that expense should be incurred. Many prospects ask for free engineering services to help them determine whether they should or should not invest in new equipment. Others ask for production layouts in order to copy ideas. By quoting intelligently and by eliminating the so called "cats and

dogs," the salesman can save money for his company in the form of reduced paper work and engineering expense.

I want to warn you about two mistakes often made by salesmen. Instead of getting all the pertinent facts first and then forming an opinion, many salesmen guess and then accumulate only those facts which substantiate that guess. It takes careful training to get into the habit of acquiring and studying facts before you arrive at an intelligent course of action.

Many salesmen make the second mistake when they develop the "gossip

complex." Don't be curious about your prospect's private life. Learn all you can about him, but never let his personal problems be the subject of conversation if they in any way lower your admiration or respect for him. He will resent your knowing those facts.

Selling machine tools isn't a "hit or miss" effort. Learning all we can about our prospects is but one of several major sales assets. The more we know, the better we can do our missionary work. The more intelligent missionary work we do, the better our chance of developing orders. If by our own efforts we create an order, and the machine we deliver performs in accordance with our predictions, we get a thrill that just can't be measured in dollars and cents. We have, at the same time, made a friend, a profit, and an open door for future business.

May I suggest that sometime while you are relaxing in the reception room, awaiting an important interview, you give yourself the "acid test." Record all the facts you know about the prospect, his company, and its problems—then decide whether you are prepared to argue your case. If not, why not?

#### **SINGLE-PHASE CONTROL FOR RESISTANCE WELDING**

A single-phase to single-phase low frequency electronic welding control that has a lower kva demand and a higher power factor than the standard control is available from Westinghouse Electric Corporation. It makes possible the welding of scaly or rusty steel with a minimum of spitting from the electrodes and also can be used for welding brass or aluminum.

This control is a frequency converter which, by means of electronic tubes, converts current at line frequency to current at lower frequency. The complete unit consists of three basic components: a sequence panel which coordinates electrical functions of the control with the mechanical functions of the welder; a frequency control circuit which transforms line frequency into a lower frequency; and a weld timer which times duration of the welding current.

The control is designed for connection to a resistance welding machine having a specially constructed transformer with a center tapped primary. Operation of the control is such that

current is passed in one direction through the primary for four half-cycles, stopped and then reversed for four half-cycles thus producing a low frequency alternating current on the output side of the transformer. The electronic circuits accurately control the duration of each of these one-half cycles.

**Westinghouse Electric Corp.  
P. O. Box 863, Dept. BB  
Pittsburgh, Pa.**

#### **PLASTIC EYE PROTECTOR FOR SEMI-HAZARDOUS JOBS**

For eye protection in woodworking, grinding, spot welding, and similar light-duty operations Willson Products, Inc., have added two newly-styled MonoGoggles to their line of industrial protective equipment.

Made of a one-piece plastic lens, the MonoGoggle offers wide vision and ample eye protection. Its light weight, high impact resistance, and low heat transmission of the lens, which retards fogging, all contribute to wearer comfort.



Both flat and curved lenses are available, so that workers who wear prescription glasses may select the style most comfortable for them. Lenses are in either clear or green acetate, and are replaceable. MonoGoggle frames for all styles may be had in clear acetate, and in mottled brown Polythene, which retains its flexibility under extremes of temperature. For additional information, write:

**Willson Products, Inc., Dept. BB  
Reading, Pa.**

# Available Literature

## CATALOGS, BOOKS AND INDUSTRIAL FILMS.....

**Air-actuated Control System.** Diagrams and test curves show how the system provides proportional action, automatic droop-correction (reset), and stabilized rate action. Illustrations show how operator switches from manual to automatic control, or vice versa. 23 pages. Construction details, specs. **Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.**

\* \* \*

**Tapping and Threading Machine.** Describes the machine's design features for sensitive, high accuracy operation, illustrating the guide-hobbing lead screw, quick-acting safety clutch and depth control which holds to within .005". Complete specs. Photos of machines and accessory equipment. **Warner & Swasey Co., Dept. BB, Carnegie Ave., Cleveland, O.**

\* \* \*

**Flexible Shaft Machines.** 8 pages of flexible shafts and equipment which includes drills, wheels, brushes, chucks, burs, buffs, etc., illustrated, specs., prices. **Foredom Electric Co., 27 Park Place, Dept. BB, New York City.**

\* \* \*

**Turrets.** Typical applications of turrets on actual jobs. A new model is shown, available for lathes from 9" to 32" swing. Turret selections for particular lathes are simplified by selection charts showing lathe manufacturers' recommendations as well as recommendations for lathes no longer manufactured. 16 pages. **Enco Mfg. Co., 4522-4 Fullerton Ave., Chicago 39, Ill.**

\* \* \*

**Siewek Jigs, Fixtures, Clamps.** Catalog contains addition to the jig, clamp and fixture line. Small jigs in spring and rack and pinion types have been added to the line. Three new clamps in six sizes each with a new double strap and three new spring jack locks also included. New small cams, acorn nuts and spherical washers have been added to aid in the building of fixtures for small parts. 150 pages. **Siewek Tool Co., 2862 E. Grand Blvd., Dept. BB, Detroit 2, Mich.**

\* \* \*

**Webber Angle Gages.** A complete set of 16 angle blocks will yield 356,400 angles in steps of one second with an accuracy measured in millionth parts of a circle. Blocks can be combined to measure angles in degrees, minutes and seconds. 4 pages, diagrams, pictures. Typical problems are solved. **Webber Gage Co., 12900 Triskett Rd., Dept. BB, Cleveland 11, O.**

\* \* \*

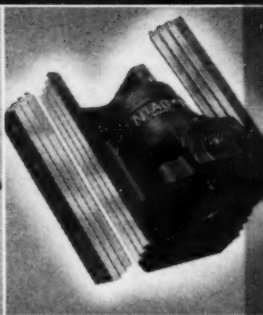
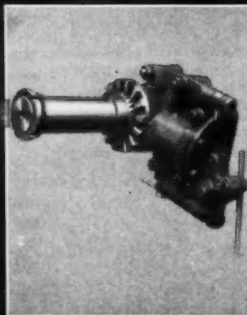
**Parkson Gear Tester.** Gear faults can be rapidly determined: testing for noise and vibration, measuring the backlash of two gears, eccentricity of pitch line, tick teeth, spacing errors, off-center teeth, burrs, etc., can be readily determined. 8 pages describes models available. Photos, drawings, general gear information. **George Scherr Co., 200 Lafayette St., Dept. BB, New York 12, N. Y.**

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● You get the same advanced design in small Niagara Inclinable Presses as you get in the largest sizes. Don't overlook the importance of this because small presses run as much as 6½ times as fast as large presses. Regardless of size you get quality when you get Niagara Inclinable Presses.

*Instant Engagement of the Sleeve Clutch as compared with the slower action of other mechanical press clutches produces more work strokes per hour.*

*Multiple "V" ribs provide more guiding surface which minimizes wear, maintains alignment of slide with bed and thus increases die life.*



NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

DIS

# NIAGARA

## SMALL INCLINABLE PRESSES

*Give you all these*

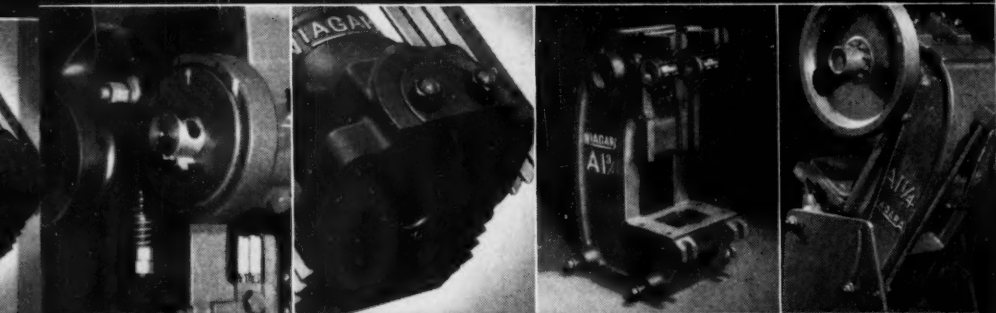
## BIG PRESS FEATURES

Brake automatically compensates for wear as well as expansion due to heat of operation. Drum and hand marked to indicate correct adjustment.

Slide designed to assure solid backing for die from center to front as well as rear. Breech block die clamp gives solid backing to punch shoe.

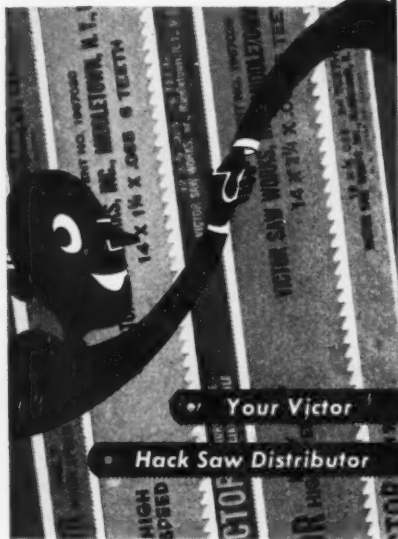
Frame designed to provide solid gib mountings, strength at the crankshaft bearings and a rigid gap maintaining close alignment of punch and die.

Inclining mechanism easily operated by one man. Working height is not materially changed when press is inclined.



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Get acquainted with your Victor Hack Saw distributor. He'll be glad to show you how to cut metals and non-metals easier and faster, and cut costs too with Victor Hack Saw Blades.

And while you're at it ask him for the NEW Victor Wall Chart for your workshop — the Victor Metal Cutting Booklet for your pocket or tool kit — both are packed full of helpful information . . . ABSOLUTELY FREE.



SAW WORKS INC.  
MIDDLETOWN, N. Y.

Makers of hand and power hack saw blades,  
frames and band saw blades.

Shears which cut to micrometer accuracy are described in a 32-page booklet. Description of machines, constructional details illustrated with photographs, are included. Specs. and special equipment for faster and more accurate cutting also supplied. **The Cincinnati Shaper Co., Dept. BB, Cincinnati, O.**

**Metal Hose.** It is claimed that hoses, designed especially for conducting coolants on machine tools combines easy adjustability with rigid maintenance of position on the work. 4 pages, photos, applications. **Chicago Metal Hose Corp., Dept. BB, Maywood, Ill.**

**Floor Resurfacing.** Ruggedwear is a resurfacer for industrial floors, recommended for application over concrete, brick, stone, composition, steel or wood. It is said not to grind away, dust, crack or become slippery. Applications, photos, users, distributors listed in 4 pages. **Flexrock Co., Filbert & Cuthbert, West of 36th St., Dept. BB, Philadelphia, Pa.**

**Portable Power Tools for the farm, the home and industry.** Listed in 18-page catalog are saws, flexible shaft machines, drills, polishers, attachments, drill stand, saw stands. Illustrated, specs., in-use photographs.

**Portable Power Tools for railroad maintenance.** 36 pages show rail drills, rail sloters, rail grinders, frog, crossing and switch grinders, concrete vibrators, chain saws. Accessory equipment, saws, flexible shaft machines also illustrated. Photos, specs. Both available from **Mall Tool Co., 7740 S. Chicago Ave., Chicago 19, Illinois.**

**Portable Air Tools.** Illustrates practical streamlined design of new power tools. Informative data on air pressure and air tool efficiency. Tools listed include: horizontal grinders and buffers, vertical grinders and disc sanders, drills and reamers, screwdrivers and nutrunners, wrenches. 40 pages, specs., illustrations. **Buckeye Tools Corp., Dept. BB, Dayton 1, Ohio.**

**Hard Surfacing Electrode** discusses various kinds of electrodes. Emphasis on special manganese nickel shielded arc electrodes. Here the weld metal does not normally contain any free carbides, and being air toughening, does not require quenching in water to make it tough. Page Steel & Wire Div., of American Chain & Cable Co., Inc., Dept. BB, Monessen, Pa.

**Precision Thread and Form Grinder.** Crush dressed wheels produce accurate threads and forms fast and economically. Wheel dressing is reduced. Wheels dressed with rolls generate less heat during the grinding operation. 22 pages of data, photos and illustrations on crush wheel dressing. Precision thread and form grinder described. The Sheffield Corp., Dept. BB, Dayton 1, O.

**Sharpening Flat and Round Broaches.** Machines include flat broach sharpeners handling broaches up to 32" and 65" long, round broach sharpeners up to 36", 72" and 84" long, and two universal models handling both round and flat broaches. 12 pages. Photos, specs., line of accessory equipment. Colonial Broach Co., Box 37, Harper Station, Detroit 13, Mich.

**Hand Operated Steel Bending Brakes** have quick and simple adjustment for ease of operation. Can be operated by inexperienced help. Each end clamps independently on brakes over 4' long. Accurately clamp on bending line without disturbing position of sheet. 8 pages. In-action photos, specs., special brakes also described. Dreis & Crump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

**Retaining Rings.** 28 pages of engineering specs. and data on Truarc rings. Data includes: ring dimensions, housing and shaft and groove dimensions, thrust load capacities, materials, tensile strengths and types of finishes. Charts of recommendations and Truarc specifications for standard ball bearing assemblies. Truarc Div., Waldes Kohinoor, Long Island City, Dept. BB, New York.

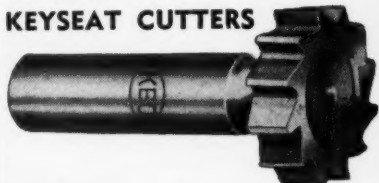


## CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

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High speed. Right hand.  $\frac{1}{2}$ " shank. Diameters from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set of 41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.



## CENTER REAMERS

High speed steel. Reamers from  $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made to your specifications.

## LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from  $\frac{1}{8}$ " to 1" are .0005" undersize at small end, from  $1\frac{1}{8}$ " to 3", .001" undersize. Immediate delivery.

### Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

## KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

**New!**  
**famco**  
*Power*  
**SQUARING  
SHEARS**



**\$480<sup>00</sup>**  
and up  
(LESS MOTORIZATION)

Rear View of Power Drive Mechanism (Guard Removed)

**QUALITY FEATURED AT A NEW LOW PRICE**

- Saves equipment investment for departments and shops doing light work.
- Low initial cost . . . economical to operate.
- Sturdily built throughout . . . powerful gear drive. Cuts up to 18 gauge mild steel.
- Has non-repeat (single-stroke) mechanism, easily set for continuous operation when desired.
- Inlaid, precision-ground high carbon tool steel blades regularly furnished. High speed blades available at additional cost.
- Easily adjustable front and back gauges, hold-down, and guard furnished as standard equipment.
- Three sizes . . . 36", 42" and 52" cutting widths.

This new Power Shears is the latest addition to the Famco Line of cost cutting machines, intended to meet the growing demand for lightweight, low-cost power machinery. For information about the complete Famco Line, write to—

**FAMCO MACHINE CO.**  
1320 RACINE ST. • RACINE, WISCONSIN

**famco**  **machines**

ARBOR PRESSES • FOOT PRESSES • POWER PRESSES  
FOOT SQUARING SHEARS • POWER SQUARING SHEARS

**Transfer Machines.** 13-station special machine automatically completes 11 operations in 48 seconds . . . another performs 3 to 12 operations with wide range of tools. Machines described in 4 page folder. **Snyder Tool & Eng. Co., 3400 E. Lafayette, Dept. BB, Detroit 7, Michigan.**

**Carbide Tips and Tools.** 28 page bulletin lists and describes standard line of sintered tungsten carbide tips and tools, boring bits, Mechanigript adjustable tool holders; also special tips, nibs and wear parts. **Firth Sterling Steel & Carbide Corp., Dept. BB, McKeesport, Pa.**

**Inert Gas Welding** is discussed in bulletin by Fansteel, specifically stressing Tungsten Electrodes. Necessary for perfect welding is stability. For this Tungsten is ideally suited. Illustrated, specs. **Fansteel Metallurgical Corp., North Chicago, Ill., Dept. BB.**

**Free Machining Alloy Steel** is Rycut, said to develop hardness comparable with that of AISI 4150-SAE 4150. It is claimed savings of 25% to 50% in machining time may be effected, compared to standard alloys. 4 pages. **Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.**

**Tapered Bearings** claim many advantages in the anti-friction bearing field: they can carry heavy loads, carry vertical and thrust load, are adjustable. 10 pages of illustrations, text, comparisons. **Tyson Bearing Corp., Dept. BB, Massillon, Ohio.**

**Standards of Hydraulic Institute.** Pertinent engineering and pump data. Defines a product, material, process or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety operating characteristics, quality, rating, testing, and service for which designed. Among sections are: centrifugal, rotary, reciprocating pumps, pipe friction, etc. Copiously illustrated with drawings and photos. **Hydraulic Institute, 90 West St., Dept. BB, New York 6, N. Y.**

**Ges Electric Hand Shears.** Especially designed for use in the sheet metal industry. Will cut 14 gauge hot rolled sheet steel or 16 gauge stainless steel. 2 pages of illustrations, specs., prices. **Jefferson Engineering and Mfg. Co., Walker St., Dept. BB, Detroit, Mich.**

**Die Flipper.** One man can quickly and efficiently test alignment, drill punches in place, tap for screw holes, hand stone, and make visual inspection. Can be used as a radial drill. 8 pages. Illustrated operational sequence. specs., construction details. **Moore Special Tool Co., Union Ave., Dept. BB, Bridgeport, Conn.**

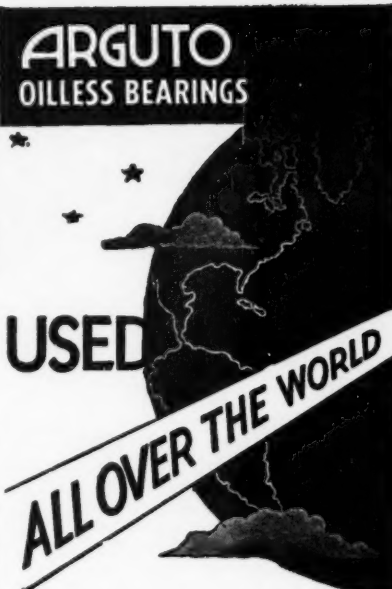
**Precision Lighting.** Maximum adjustability are achieved with the Ajusco bracket lights through use of universal joints. Lights are used for close work on assembly, machining, inspection, etc. 13 pages. Case histories, photos of applications. Prices, specs. **Adjustable Fixture Co., E. Mason St., Dept. BB, Milwaukee, Wis.**

**Metal Preservation and Paint Durability.** Seven little folders discuss the protection of aluminum, removal of rust, metal cleaners, protective zinc phosphate coating process for steel, sticking of paint to galvanized iron, etc. Illustrations, descriptions. **American Chemical Paint Co., Dept. BB., Ambler, Pa.**

**Form and Cut Off Tool Blanks.** Includes new series of blanks for all automatic screw machines using circular form tools. Made from special high speed steel, claimed to give longer life per grind on all tough machining materials. Lists line of form tools furnished hard to 62-63 Rockwell C. 4 pages. Illustrated. **Production Service Co., 1060 Broad St., Dept. BB, Newark, N. J.**

**Natco Holesteel Drillers.** Three machine sizes are illustrated and described in detail with illustration of outstanding features of five actual records of production jobs. Construction details, specs., photos. **Natco, Dept. BB, Richmond, Ind.**

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The CHICAGO Bench model light combines all of the features of our other lights but is designed for horizontal mounting.

This model comes in lengths of 31", 37" and 43". All lights have Underwriters approved sockets, cords and plugs. When ordering be sure to specify length.

**\$7.95 Each in quantities of 12.**

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**\$9.50 Each less than 6.**



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The CHICAGO Wall model light is available in lengths of 34", 40" and 46". Ideal for use on presses, lathes, mills, or where direct vertical mounting is necessary.

All models are finished in grey baked enamel and have adjustable shades which are green outside and frosted on the inside. When ordering be sure to specify length.

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#### **INTRODUCTION TO TOOL ENGINEERING**

*By Halsey F Owen, Associate Professor of Industrial Engineering, Purdue University, Member of American Society of Tool Engineers. Published by Prentice-Hall, Inc., New York. 1948. 149 pages. \$3.60..*

This interesting book might be termed a streamlined survey of an industrial field which, although it has always been a vital part of the industrial pattern, has been brought into especial prominence by World War II. This field is usually referred to as tool engineering; the author defines it as "determining, selecting, designing, applying, and developing to greatest efficiency the means of mass and interchangeable production." The capacity and complexity of production in recent years has necessitated a clearer approach to the field. This volume takes the reader into the field in clear, concise language; it is admirably arranged, either as a text for the technical student, or to the practicing tool engineer.

The book is divided into ten chapters, beginning with two introductory chapters on the responsibilities of the engineer, and manufacturing methods and equipment. The main body of the text consists of a discourse on methods and parts analysis, the use and arrangement of operation sheets and bills of material. An interesting section is Chapter 5, captioned "Designing for Production," which discusses the consideration of the use of available equipment as well as design improvement.

Manufacturing costs and tooling programs, and the economics of tooling are

next taken up. The chapter on tool design, with the consideration of jig and fixture, press-die and gage designing, is one which is important to the tool engineer. The volume concludes with a chapter on estimating tool costs, containing a dissertation on tool cost factors and their necessity, with appropriate examples.

#### **MOLYBDENUM: STEELS, IRONS, ALLOYS**

*By R. S. Archer, J. Z. Briggs and C. M. Loeb, Jr. Published by Climax Molybdenum Company, 500 Fifth Avenue, New York 18, N. Y. 1948. 391 Pages*

The varied applications of molybdenum as an alloying element are described in this book, which covers a wide range of materials from wrought to cast steels and from cast iron to nonferrous alloys. The emphasis has been placed on the presentation of the fundamentals that must guide all engineers, designers and metallurgists in selection of the most suitable materials for a given application.

In the past, many books have been confined to the presentation of uncorrelated data on specific compositions, each of which has been treated as a separate entity, although many of these are interchangeable within certain limits. In this volume, an attempt has been made to show the fields of similarity and dissimilarity of the various materials and to indicate some of the factors that may affect the choice of the most economical material for a specific part.

The scope of the book is illustrated by the main section headings: Technical Effects of Molybdenum, Fundamental Effects of Heat Treatment on Microstructure, Addition of Molybdenum, Wrought Alloy Engineering Steels, Wrought Steels for Elevated Temperature Service, Tool Steels, Steel Castings, Cast Iron, Special Purpose and Nonferrous Alloys.

Much recent information is included, not only on the more prominent developments, such as the gas turbine steels

and alloys; but also on the work that has served to clarify the factors affecting the service life of the lower alloy steels. The references to current literature are adequate to facilitate further reading by anyone who desires more detailed data.

A useful addition is the compilation of much hard-to-find information on some of the specialty applications, such as exhaust valves, elevated temperature springs, ferritic gas turbine steels, high permeability alloys, contact materials, grid wires, and prosthetic alloys. The appendices include data on standard compositions of American, British and French engineering steels, working stresses from the Boiler Code, conversion tables, and the physical properties of metallic molybdenum.

#### HOW TO START AND OPERATE A PROFITABLE WELDING BUSINESS

*The Hobart Brothers Company, Hobart Square, Troy 1, Ohio. 1948. 64 pages. \$.10.*

This useful and interesting booklet deserves mention among the new technical books, due to its timeliness and general reader value to machine tool executives and shop foremen, nearly all of whom have occasion to utilize a handbook of this character. It is the type of informative small volume which is extremely handy to have available on office bookshelves, due to the wide scope of information which it contains.

The book takes the reader through a step-by-step plan for starting and operating a job welding business. It offers money-making suggestions for Job Welding Shops, Blacksmith Shops, Auto Repair Shops, Sheet Metal Shops, Machine and Tool Shops and Ornamental Iron Works. Each chapter covers various important phases in the successful operation of a welding business. The book contains numerous photographic illustrations depicting some of the opportunities which are available for the aggressive welding operator.



#### THE ONE-MAN GANG

Towmotor Corporation  
Cleveland 10, Ohio

*30 minutes. 16 mm. sound. Available groups, shown by Towmotor representative; Towmotor Corporation, 1226 E. 152nd St., Cleveland 10, Ohio.*

This interesting film takes its audience into a number of leading manufacturing plants to show the methods employed in reducing materials handling costs. Its basic purpose is to show the complete processes for the economical "mass handling" of materials that one might observe on a visit to such concerns as American Airlines, Nicholson Transit, California Packing Co., Pepsi-Cola, Ferro Machine & Foundry, Youngstown Sheet & Tube, and others.



By observing the actual applications of the modern principles of materials handling, one learns just how useful fork lift trucks and tractors have become in modern, efficient plant operation.

As the picture demonstrates, 80% of

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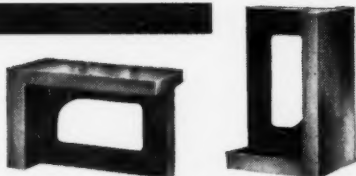
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### The Challenge Machinery Co.

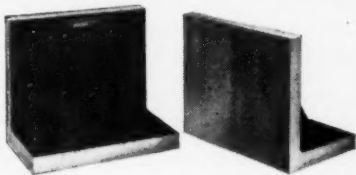
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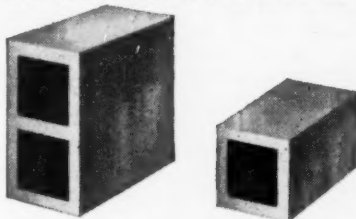
GRAND HAVEN, MICHIGAN



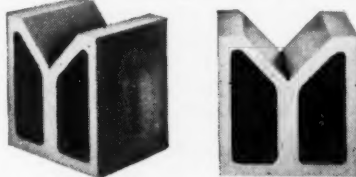
**UNIVERSAL IRONS**—Four sizes from 4x5x3-3/4 inches to 8x10x5 1/2 inches.



**ANGLE PLATES**—22 sizes from 3 1/2 x 4 inches to 24 x 24 x 24 inches.



**BOX PARALLELS**—18 sizes from 1 1/2 x 2 x 4 inches to 12 x 12 x 24 inches.



**V-BLOCKS**—Seven sizes from 2x2 1/2 x 5 inches to 12x12x12 inches.

the unskilled workers in the average plant are used to move things in the process of production, while 22% of the average payroll goes for such work. Another factor brought out is that the cost of handling materials usually exceeds the freight charges. Thus a modern system of materials handling reduces the cost of production and distribution. The picture shows how "Mass Handling—the systematic movement of the most units in the shortest time and at the lowest cost" becomes an effective means of cost reduction. This point is repeatedly emphasized in one plant operation after another.

A 15,000-pound capacity Towmotor is shown handling 15,000 pound rolls of steel every two minutes at Youngstown Sheet and Tube. Another sequence shows how Pepsi-Cola mechanized their manual handling problems at East Chicago.

Other interesting moments in the picture include the rapid loading of cargo in American Air Lines planes, handling rolls of paper at Nicholson Transit in Cleveland, the movement of Del Monte Coffee from bean to can by California Packing at Bush Terminal, Brooklyn, where space is at a premium.

The film presents frequent demonstrations of the various Towmotor models and accessories. The many industrial applications provide a convincing review of the economic importance of modern materials handling equipment.

#### **MIGHTY LABORS**

Industrial Engineering College  
Chicago 24, Ill.

*34 minutes. 16 mm. sound film. In full color. Available without charge from Industrial Engineering College, 3309 W. Washington Blvd., Chicago 24, Ill.*

This recently released film is a timely answer to the question, "What is Industrial Engineering?" It explains this problem in a manner which may be easily understood. The film illustrates and explains the various modern controls which are essential to economical production.

Assistance in producing this film was provided by twenty-four major business and industrial firms in the Chicago and Detroit areas, including such important names as Marshall Field and Company, Carnegie-Illinois Steel Corp, Chrysler Motors Corp., and Zenith Radio Corp. The film includes ninety scenes made in the cooperating plants, plus natural scenes from California and the Midwest, and three scenes taken in the laboratories of the College.

In demonstrating the various phases of Timestudy, Methods Engineering, Job Evaluation, Plant Layout, Process Charting and Wage Incentives, the film clarifies the functions, principles and practices of the Industrial Engineering profession. It shows how the application of these techniques plays an important role in our entire modern mode of living.

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#### **NEW G. E. TURBINE BUILDING NEARS COMPLETION**

General Electric's new 30-million dollar turbine building is nearing completion in Schenectady, N. Y. Nine machinery bays, each approximately a quarter of a mile long in width from 60 to 80 feet. The two largest bays (80 feet wide by 91 feet high) are each equipped with traveling cranes on two levels, the higher level being 61 feet above the operating floor.

More than a million square feet of floor space will be utilized for manufacturing. Enough turbines can be produced in a month in this building to supply light and power for a city of a million people.

A total of three and a half miles of standard gage railroad track will run into and through the building. More than 10,000 lighting fixtures will be necessary for illumination. The lighting load alone will require about 4,000 kw.

The new plant will be completed sometime in 1949. Movement of manufacturing equipment from the old turbine building has already begun.

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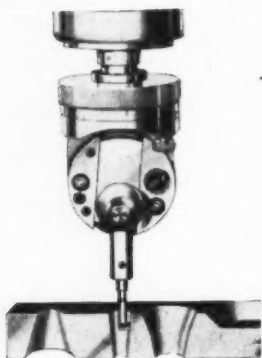
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**"SPEED UP** YOUR TOOL WORK  
WITH THIS VERSATILE

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**TREE TAPER BORING TOOL!!**

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# News of the industry. . . . .

## SCOPE OF N.M.T.B.A. MEMBERSHIP ENLARGED

Membership in the National Machine Tool Builders' Association will be open hereafter to the individuals, co-partnerships and corporations engaged in the manufacture of metal-forming machine tools as well as metal-cutting machine tools, it has been announced by Lloyd D. McDonald, president of the association and vice president of the Warner & Swasey Company, Cleveland.

An amendment to the constitution of the association has added to its membership qualifications clause this sentence: "A metal-forming machine tool is a power-driven machine, not portable by hand, used to press, forge, emboss, hammer, blank, or shear metal."

McDonald, who was chairman of the committee on qualifications for association membership prior to his election as president, explains that this definition of a metal-forming machine tool does not include die casting machines, extruding machines, rolling mills or welding equipment.

The stated purpose of the association is now "to promote the lawful interests of the metal-cutting and metal-forming machine tool industry (known as the machine tool industry) in the direction of good business ethics; the liberal discussion of subjects pertaining to improvement, standardization and the methods of manufacturing and marketing tools."

## A.S.M.E. CONFERS AWARDS AT 69TH ANNUAL MEETING

The American Society of Mechanical Engineers conferred its 1948 national honors and awards on some of the nation's most eminent scientists, inventors and engineers during the Honors Night dinner of the 69th Annual Meeting, held in New York the week of Nov. 28-Dec. 3, 1948.

E. G. Bailey, New York, president of the engineering society, and vice president of the Babcock & Wilcox Co., delivered the presidential address on the subject, "Engineering Opportunities in Industry."

James M. Todd, New Orleans consulting engineer, was introduced to the gathering as president-elect; he assumed office on Dec. 3rd.

Dr. Frederick G. Keyes, head of the department of chemistry, Massachusetts Institute of Technology, Cambridge, Mass., was awarded the ASME Medal, highest honor of the society, conferred annually for distinguished service in engineering and science and regarded as an outstanding award in the scientific world.

Edward Smith Cole, president of the Pitometer Log Corp., New York, was awarded the Worcester Reed Warner Medal, "for his contributions to methods of measuring the flow of water in conduits and the speed of ships, based on original application of the Pitot tube, and the development of the Cole Pitometer."

The Holley Medal, for scientific and engineering achievement, was bestowed on Edwin H. Land, president of the Polaroid Corp., Cambridge, Mass., cited as "scientist, inventor, engineer; for his great and unique work in polarized light and optics; his original research and development of war weapons . . . and many accomplishments for the public benefit." Dr. Theodore von Karman, one of the world's most eminent scientists in the field of applied mathematics, was present to receive the John Fritz Medal, for which he was cited last February during his absence in Europe on important technical missions. It is a joint award of the four engineering "founders," The American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers and American Institute of Electrical Engineers, and is one of the world's most coveted medals.

#### AIRQUIPMENT BUYS AEROL CO., INC.

Airquipment Company, Los Angeles, announced recently the purchase of Aerol Co., Inc., manufacturers of materials handling equipment and developers of the only guaranteed watertight wheel on the market.

Aerol Company will continue as a separate entity under its own name as a subsidiary of Airquipment Company, manufacturers and marketers of aircraft ground handling equipment. Frank Gaines, founder of Aerol, will remain as an active participant in the development and expansion of Aerol products.

In announcing the acquisition of the company, N. L. Smith, vice president of Airquipment, declared, "Under the former set-up, Aerol was simply unable to fill the orders with which they were flooded, particularly since the announcement of the Aerol-Seal wheel. The purchase by Airquipment will insure Aerol customers of the resources and facilities necessary to give them more efficient and expeditious service and the continued development and improvement of Aerol products."

#### WESTINGHOUSE ATOMIC POWER DIVISION

Gwilym A. Price, president of the Westinghouse Electric Corporation, has announced the formation of an Atomic Power Division which will concentrate solely on the harnessing of nuclear energy for the production of useful power.

The new Division will carry on atomic energy projects for the U.S. Government as well as project independent studies. The division will work closely with the Westinghouse Research Laboratories and with other divisions of the company.

Manager of the Atomic Power Division will be Charles H. Weaver, a young Westinghouse executive who has recently served as industrial manager of the company's central district with headquarters in Pittsburgh.

#### PANNIER CELEBRATES 50TH YEAR

A historical plaque commemorating the 50th anniversary of The Pannier Corporation in 1949 was presented to management by employees of the marking device firm at the annual Pannier Christmas Party held at the Fort Pitt Hotel, Pittsburgh, Pa. In the illustra-

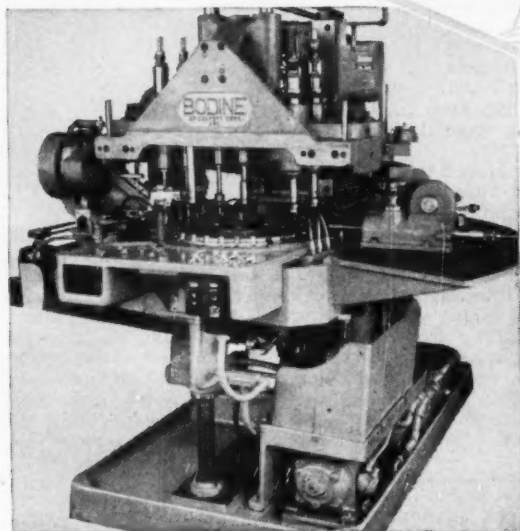
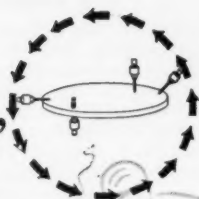


tion, Ralph A. Pannier (right), president of the firm, and W. J. Pannier, Jr., chairman of the board, examine the plaque. Harry W. Ehrlen, Pannier advertising manager, who made the presentation on behalf of the employees, stands at the rear.

Here's where

## "THINKING IN CIRCLES"

means Substantial Savings



The center of activity in a Bodine automatic Multiple Spindle Milling, Drilling, Tapping and Screw Inserting machine is around the circle of the horizontal indexing table. Small components are carried to working stations where tools are located to operate vertically, horizontally, diagonally or even from an inverted position. Thus a great variety of tooling combinations may be arranged . . . for high speed cost-cutting production.

For instance, one manufacturer reports that a battery of sixteen Bodine's shows a saving over previous production methods of up to \$200.00 per day for each machine.

We suggest that you permit our engineers to do some "thinking in circles" for you . . . to provide the exactly right machine and tooling for your specific job. There's inspiration for production executives in the new Bodine Bulletin . . . send for your copy today.



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## NEW CARPENTER STEEL RESEARCH LABORATORY

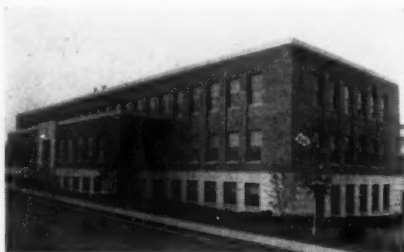
The Carpenter Steel Company's new research laboratory, built to accelerate the Company's development of specialty steels for industry, has been dedicated to those employees who served in the armed forces during World War II.

According to Company officials, the new laboratory will provide improved customer service; assist in improving present steels, as well as aid in the developing of new steels.

From the early development of chrome-nickel steels in 1892, to new types of super corrosion resisting steels in 1948, the laboratory has been in the forefront in pioneering special alloy steels.

In 1928 Carpenter introduced the first free-machining, straight chrome stainless steel (Type 416), and in 1932 invented free-machining 18-8 stainless steel (Type 303). Several years later, in cooperation with the electrical industry and instrument manufacturers, the Company developed highly-specialized nickel alloys including free-machining low expansion invar. In 1948 the first commercial production of wrought 20% chrome, 29% nickel sulphuric acid resisting stainless steel, was announced by Carpenter.

Coincident with its pioneer work on alloy and stainless steels, the Carpenter laboratory was active also in the development of both carbon and alloy tool steels.



The new laboratory, housing some of the latest metallurgical and physical testing equipment, was built to accelerate this development work still further. It is expected that their new facilities will enable The Carpenter Steel Company to serve the metalworking industry even better than before, both in the servicing of steels now in use, and in the development of new steels to meet new conditions.

## AMERICAN STANDARDS ASSOCIATION RECOMMENDS INDUSTRIAL FINISHES

Four shades of gray for use in painting industrial machinery and equipment are recommended in a proposed standard for Gray Finishes for Industrial Apparatus and Equipment being circulated for comment and trial use. Although the standard does not recommend that gray necessarily be used, it does suggest that when industrial apparatus is painted gray the use of these standard shades will help in matching the shade desired and in providing better color harmony.

For convenience, color chips have been prepared so that those interested can visualize what the color described will look like on their machines. These color chips can also be used in making a quick visual check or comparison of the colors.

The four standard grays recommended are: Light gray; medium light gray (or standard machine tool gray 7-B); medium dark gray and dark gray.

The proposed standard not only identifies the standard grays by number and Munsell notation and provides for the use of color chips, but also recommends tolerances for both the secondary standards and the spectrophotometric work. In addition it makes recommendations as to gloss and texture.

The Proposed American Standard Gray Finishes for Industrial Apparatus and Equipment, Z55, was prepared by a committee of 16 national organizations, producers and users of industrial equipment and producers of industrial finishes, and four individual members widely recognized as authori-

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stop file tracks . . .  
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ties in the use of color. The committee is sponsored by the Mechanical Standards Committee under the procedure of the American Standards Association.

#### **WAHLUND MOVES TO GRANT, IOWA**

M. Paul Wahlund Mechanical Laboratory announces the completion of their new, modern manufacturing plant at Grant, Iowa into which they set up operations as of January 1, 1949. The firm will continue tool, die, and machine work, and contract manufacturing, together with their specialties which include concrete anchors for telephone equipment and small rubber-tired wheels. Facilities and personnel for product development will be maintained.

The company also announces the purchase of the Unique Manufacturing Company which for 17 years has been operated by D. D. Williams, in Omaha, Nebraska. Unique Manufacturing Company is the maker of "Unique" Production Tools and Attachments for small lathes. It will be operated as a division of the M. Paul Wahlund Mechanical Laboratory and under the management of M. Paul Wahlund. The trademark, "Unique Production Equipment" will be used on tools manufactured by this new division.

With the acquisition of the Unique line, Wahlund Mechanical Laboratory will now be in a position to offer distributors and consumers a more complete line of quality merchandise.

#### **RIMAT MACHINE TOOL CO. HAS NEW QUARTERS**

Richards Machine Tool Company, manufacturers of "Rimat" Machine Tools and Micrometers will hereafter be known as Rimat Machine Tool Company, according to an announcement by James H. Richards, general manager. Coincident with the change in name, the Plant and Offices of the company have been moved to new and larger quarters located at 1117 Air Way, Glendale 1, Calif. The facilities provided by the new plant will enable the company to increase production on the "Rimat" line of precision measuring instruments.

#### **J. W. EKEGREN**

J. William Ekegren, 54, secretary and treasurer of the Accurate Bushing Company of Garwood, N. J., and well known in the tool, die and allied industries, passed away on December 17, 1948, death resulting from a heart condition. He had been with the Company since 1942, and resided in Chatham, N. J.

#### **G. E. WEST COAST MOTOR MANUFACTURING PLANT**

A \$3,000,000 motor manufacturing plant, which at peak production will be able to turn out more than 1,500 electric motors weekly, was officially opened by the General Electric Company at San Jose, Calif., November 18.

One of the largest and most modern industrial plants in Central California, the 144,000 square-foot factory is producing electric motors, ranging from 1 to 500 h.p., at the rate of several hundred weekly. At peak production, expected to be reached in 1949, the plant will turn out more than 1,500 motors weekly. These will include single-phase integral horsepower motors designed for operation on 115- or 230-volt circuits and widely used in home, farm, and industrial applications. The 5- to 500-h.p. polyphase motors are designed for irrigation pumps and are widely used in the California area.

Approximately 100% of the plant's polyphase motor production will be for the western market, while about 90% of the small motors—those for use in air compressor equipment, home freezers, home work shops, farm machines, etc.—will be produced for the company's national and international markets.

#### **BIGGSTAVA TAKES OVER KYLE-JOHNSON**

The manufacture and sale distribution of Kyle-Johnson Quick Change Lathe Tools has been taken over by the Biggstava Corporation, located at 3357 Union Pacific Ave., Los Angeles, Calif. Kyle-Johnson Quick Change Lathe Tools are one of the very few effective lathe tool patents.

## RAYBESTOS-MANHATTAN LOS ANGELES WAREHOUSE

Raybestos-Manhattan, Inc., has announced its new modern Los Angeles Warehouse and Office at 4651 Pacific Boulevard, Los Angeles 11, to service and stock rubber goods and packings for industrial and oil field requirements for Southern California. It will supplement and service distributors' stocks of standard products to permit prompt deliveries. Principal products carried are conveyor belt, V-belts, transmission belts, industrial rubber hose of various types, rotary oil well drilling hose, asbestos and rubber packings for industrial and oil well machinery.

### NEW PLANT FOR J. K. SMIT & SONS

J. K. Smit & Sons, Inc., recently announced the completion of their Murray Hill, New Jersey plant which will substantially increase facilities and open the way to important economies of operation.

The first moves were scheduled to

begin November 15th, and it is hoped to complete the entire transfer by February 15th, 1949. In order to cause as little delay as possible, one department after another will be shifted to the new location.

All communications and shipments should be addressed to the firm's New York address, at 157 Chambers St., until further notice.

### ADAMAS CARBIDE MOVES

On December first, the Adamas Carbide Corporation, formerly of Long Island City, N. Y., moved to 1000 South Fourth Street, Harrison, N. J.

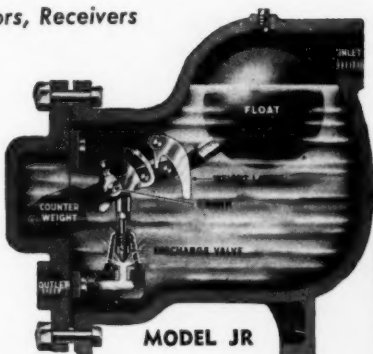
Included among the many modern features in this new plant, are controlled temperature and humidity in powder and press rooms, more and larger presses for automatically pelleting standard shapes and pressing specials, new furnaces with electrical and optical temperature controls, and considerable other equipment valuable in maintaining quality control.

# 6 Ways Nicholson Units CUT AIR TRAP MAINTENANCE

*On Intercoolers, Aftercoolers, Separators, Receivers*

Nicholson weight-operated air traps are increasingly recognized for the way they cut "down time". Below are 6 reasons why. 3 types; press. to 1500 lbs.

- 1) Leak-proof valve.
- 2) Not dependent on buoyancy of float.
- 3) Non-wire drawing.
- 4) Rugged, for unavoidable abuse.
- 5) Unaffected by dirt, pulsation.
- 6) Stainless steel where it counts.



**W. H. NICHOLSON & CO., 117 Oregon St., Wilkes Barre, Pa.**

## Appointments & Promotions

The Billings and Spencer Co., Hartford, Conn., has announced the appointment of the following sales representatives: **John A. Gallagher**, Cincinnati, will cover the state of Indiana, as well as southern Ohio and Illinois. **Donald O. Schneider** will represent the company in Pittsburgh and northern Ohio, with headquarters in Cleveland. **William J. Halliday**, Collingswood, N. J., will cover Pennsylvania, Delaware, Maryland, and part of New Jersey. **Jack DeLancey**, with headquarters in Kansas City, will cover Missouri, Kansas, Nebraska and western Iowa. **Edwin A. Jonas** will cover the Chicago territory.

Appointment of **Michael N. W. de Berardinis** as manager of sales promotion and advertising of Firth Sterling Steel & Carbide Corp., McKeesport, Pa., was recently announced by the company.



M. N. W. de Berardinis



Cornelius Van Deusen

**Cornelius Van Deusen** has been appointed assistant sales manager of the V & O Press Co., Hudson, N. Y.

**Tilden Rotary Concrete Drill Company** has recently appointed **Jack Sutherland** as sales representative.



Series "E" Model 1400-E Pivot Mount

These cylinders are made to your order with any length stroke you request in any of these bore sizes:

1½, 2, 2½, 3, 4, 5, 6, 8, 10

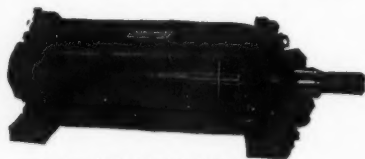
In ordering please write mounting, bore, stroke and piston rod thread you want.



Series "E"  
Model 1300  
Rear Flange  
Mount

Cylinders—any bore, any stroke, any mounting, air, water, hydraulic

## 1 WEEK DELIVERY ON THESE STANDARD CYLINDERS



Series "E" Model 1500  
Foot Mount



Series "E" Model 1200 Front  
Flange Mount

**PNEUMATICS INCORPORATED**  
OF PLYMOUTH INDIANA

Six promotions have been announced by Walter W. Tangeman, vice president and general manager of The Cincinnati Milling Machine Co., Cincinnati. **David M. Strauchen** becomes manager of a new

trol, time study, planning and tool design. **Harold Thomas** moves up from assistant to head of tool design. **Fred Miller** advances to assistant general superintendent.



David M. Strauchen



Alfred T. Blackburn



George W. Binns



John B. Elfring

special products division including the manufacture and application of Flamatic surface hardening machines. **Alfred T. Blackburn** becomes general shop superintendent. **George W. Binns**, with the company since 1913, heads up new developments. **John B. Elfring** has been promoted to manager of production con-

**Herbert E. Smith**, president of United States Rubber Co., became chairman of the board and chief executive officer of the company on January 1, and **Harry E. Humphreys, Jr.**, vice president and chairman of the finance committee, became president and chairman of the executive committee.

## QUICK AND EASY WAY TO CUT TOOL COST

- Make the most of your tool maker's time by reducing set-up time on Jig borers, milling machines, slotters, planers, boring mills, punch presses, etc.



Northwestern T nut and stud sets eliminate the time spent looking for correct length studs for each set-up. They are available in sets to fit all machinery.



Northwestern step block sets eliminate time spent looking for hit-or-miss temporary blocks and shims for each set up. Write today for detailed bulletin and selection chart showing various types and size of stud sets which we carry.

**NORTHWESTERN TOOL & ENGINEERING CO.**

118 HOLLIER AVE.  
DAYTON 3, OHIO

## ELIMINATE THREAD-GRINDING TROUBLES . . .

Most grinding-room men know that good, sharp diamonds are the best insurance against thread-grinding difficulties. We supply sharp, natural, resettable octahedrons mounted in shanks to fit all grinding machines. New and reset tools centered within .001". Resetting charge \$1.00. Ask for our new catalog, just published. Diamond Tool Research Co., 305 E. 45th St., New York 17, N. Y.



**NOW!**  
TROYKE BRINGS  
YOU A NEW POSITIVE  
STATION INDEXING  
ROTARY TABLE

MADE  
IN  
3 SIZES

Write for  
Catalog  
No. 14

### BALL BEARING

Used for station drilling and milling; often replacing expensive jigs. Markers enable operator to locate station easily. Also manufacturers of worm and worm-wheel operated Rotary Tables—11 models, 8 sizes, 9" to 25".



**TROYKE MFG. CO.**  
Cincinnati 9, Ohio, U S. A.

The recent appointment of **E. S. Sensenderfer** to the position of advertising manager of the Bonney Forge & Tool Works, Allentown, Pa., has been announced by Fred S. Durham, president of the firm.



E. S. Sensenderfer



Frank O. Lincoln

**Frank O. Lincoln** has been elected chairman of the board of the Hy-Pro Tool Co. (subsidiary of Continental Screw Co.) New Bedford, Mass.

**Alexander S. Keller**, vice president and manager of foreign sales, Pratt & Whitney, Division Niles-Bement-Pond Co., has accepted the post of senior industry officer in the Netherlands Mission of the Economic Cooperation Administration, it has been announced by Frederick U. Conard, president and general manager of Niles-Bement-Pond Co.



Alexander S. Keller



James W. Moran

Effective January 1, 1949, **James W. Moran** became president of The Baker-Raulang Company, Cleveland manufacturer of materials handling equipment, succeeding E. J. Bartlett who continues as a director.

The Palnut Co., Irvington, N. J., manufacturers of lock-nuts and fasteners, announces the appointment of **A. A. Gustafson** as their representative in the Minnesota and Iowa territories.

**J. H. Burrus** has been promoted from assistant manager to manager of the Allis-Chalmers Portland, Oregon district, effective January 1, succeeding **F. V. Sams**, who retired December 31, after serving Allis-Chalmers for 43 years, according to an announcement by **J. L. Singleton**, vice-president and director of sales of the company's general machinery division.

Promotion of **Walter A. Jayme** as general superintendent of the Gary works of National Tube Company was announced by **Leo J. Mason**, vice-president of this U. S. Steel subsidiary.

Acme Steel Company has announced that **C. S. Macnair** has joined the company in the capacity of consultant on product development.

Modern Collet & Machine Co., Ecorse, Michigan, announces the appointment of **Joseph F. Lask** as general manager and **John L. Bradford** as sales manager.



Joseph F. Lask



John L. Bradford

The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio, announces the appointment of **George A. Daniels** as secretary and treasurer, succeeding **W. C. Batchelor** whose resignation after 33 years of service was effective January 1, 1949.

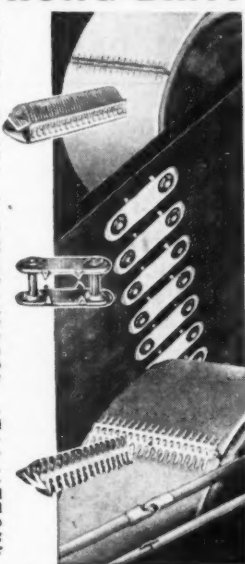
## ARMSTRONG-BRAY

**WIREGRIP** precision made Belt Hooks come with extra (patented) blue aligning cards—are held more rigid, assuring perfect alignment of hooks—less hook loss from handling—a better job when applied with any make lacing machine. 6 sizes.

**PLATEGRIP** Fasteners for . . . Conveyor Belts. Make strong dust-tight joints in belts, of any width. Spread tension uniformly across belt, allow natural troughing of belt and operate smoothly over flat, crowned or take-up pulleys. Sizes for belts from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ " thick. Easily applied anywhere.

**STEELGRIP** Flexible Lacing, applied with a hammer, clinches over and protects end of belt. Makes strong, flexible joints. Boxed with 2-piece hinged rocker pins or can be obtained in long lengths for conveyor belt use.

**Armstrong-Bray & Co.** The Belt Lacing People  
5364 NORTHWEST HWY., CHICAGO, ILLINOIS



## HIGH SPEED



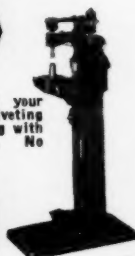
## AUTOMATIC STAKING MACHINES

Cut your assembly costs with **HIGHSPEED** . . . for staking or riveting fixed or movable joints at a rate of more than 1000 pieces per hour! Foot treadle . . . safe . . . adjustable and uniform hammer blow.

## COLD RIVETERS

Let us send you a free survey of your riveting problems. Send samples of your work completed to the riveting stage. We'll return them along with guaranteed production data. No obligation . . . write today.

**HIGH SPEED HAMMER CO., INC.**  
304 NORTON ST  
ROCHESTER 5, N. Y.



Link-Belt Company announces that **R. E. Whinrey**, formerly superintendent, has been appointed to the newly created position of assistant general manager of the Link-Belt Dodge plant in Indianapolis; **L. C. Heinlein**, formerly assistant superintendent, has been appointed superintendent of this plant.



R. E. Whinrey



L. C. Heinlein

**Selden T. Williams**, vice president of Scovill Manufacturing Co., Inc., has been appointed general manager of A. Schrader's Son Division of the company, Brooklyn, N. Y.

Promotion of **Richard M. Somers** to the position of chief engineer of the Ediphone Division of Thomas A. Edison, Inc., West Orange, N. J., has been announced by **A. P. Hornor**, vice president and manager of the Ediphone Division. Somers succeeds **Samuel G. Langley** who will assume the duties of consulting engineer to the division. **Henry S. Carlson** has been promoted to assistant chief engineer of the division.

**Bruce E. Horst** has been appointed sales representative in the Rockford (Ill.) territory for Barber-Colman Co.

At the December Directors' Meeting of Charles H. Besly and Company, Chicago, the following were promoted or newly appointed, effective January 1st: **K. Y. Taylor**, vice-president in charge of manufacturing will be executive vice-president. **W. C. Olson**, comptroller, will be vice-president and secretary. **Everett Addoms**, formerly sales promotion manager, now vice-president. **H. G. Haarz**, formerly assistant treasurer, to treasurer.

**Shorten** DRESSING TIME  
**100 %**

WITH THIS ANGLE TANGENT  
TO RADIUS WHEEL DRESSER



When 95% of all emery wheels in Michigan . . . proving ground of U. S. industry . . . are dressed on Last Word equipment. And when Last Word Dressers outsell others 10 to 1 in the same area there must be a reason. We know you too, will agree that Last Word Dressers ARE the last word. Write today for informative folder. Dealers: Several attractive territories still open. Wire or write for details.

**LAST WORD**  
**SALES and ENGINEERING CO.**  
ROYAL OAK, MICH., P. O. BOX 287

## WILL PAY SPOT CASH

FOR YOUR SURPLUS INVENTORIES  
OF SMALL TOOLS, SUCH AS:

Taps, Dies, Drills, Reamers, Cutters,  
Ground Stock, Socket Screws, Files,  
Tool Holders, Chucks, Vises, Abrasives,  
etc.

SEND YOUR LIST TO BOX B-72

c/o HITCHCOCK PUBLISHING CO.

55 West 42nd Street, New York 18, N. Y.

The firm making the above offer is a well established Tool Supply House located in the East.

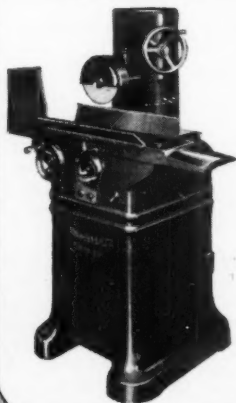
## MODEL 6-12

THE TOOL MAKER'S  
"Personal Grinder"

### MODEL 6-18 SURFACE GRINDER

An extremely accurate Surface Grinder, highly recommended for tool room work and gauge grinding. Its rugged construction and superior engineering assure constant accuracy for a longer period than is usually expected of the ordinary surface grinder.

*Write for Catalog*

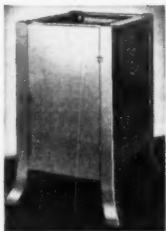


## BOYAR-SCHULTZ BENCH MODEL SURFACE GRINDER

This sturdy, accurate Surface Grinder, mounted on the tool maker's bench, is quickly available for many small jobs that would otherwise go to the Grinding Department, interrupting important production runs. It is built with many new features and to the well known Boyar-Schultz standard of quality for close tolerance grinding on tools, dies, jigs, fixtures and gauges. An ideal tool for the small shop.

*Write for Catalog and New Low Prices*

### PEDESTAL FOR MODEL 6-12 GRINDER



Made from heavy gauge angle iron, welded for rigidity and strength. With it, Model 6-12 Grinder becomes a Pedestal Machine.



**BOYAR-SCHULTZ CORPORATION**  
2108 WALNUT STREET CHICAGO 12, ILLINOIS

Detroit Broach Co. announces the appointment of **Henry T. Schlachter** as their representative in southern Ohio and northern Kentucky.

**Arthur M. Swigert** has been appointed vice president in charge of all manufacturing operations of Universal Products Company, Inc., Dearborn, Mich.



Arthur M. Swigert



Gordon P. Molsen

• • •

The Whiton Machine Co., New London, Conn., announces the appointment of **Gordon P. Molsen** as sales manager for their Chuck and Machine Tool Division. Molsen has, for the last three years, been New England District Manager for the **Hitchcock Publishing Company**, in charge of Export Trade Catalogs.

**John L. Cook**, until recently president of the Winter Brothers Co., Wrentham, Mass. (subsidiary of the National Twist Drill and Tool Co., Rochester, Mich.), has been elected president of the National Products Co., Detroit.

**Harry Crump**, manager of Cutting Tool Sales Engineering, Carboloy Company, Inc., Detroit, has been named assistant to the sales manager, according to K. R. Beardslee, vice president and marketing manager at Carboloy. **J. S. Gillespie**, formerly in charge of Wear Parts Sales Engineering, has been appointed manager of Tool and Wear Parts Sales Engineering, succeeding Crump. **A. F. Dobbrott** has been advanced to manager of Mining Sales Engineering.

At the year-end meeting of the board of directors of the Firth Sterling Steel & Carbide Corp., Pittsburgh, **Floyd Rose** retired as chairman of the board, effective December 31. He will, however, continue as an active member of the board.

**Frank H. Carrier**, vice-president of Marvel Tool & Machine Co., St. Clair, Mich., announces the appointment of **G. Henry Keeton** as exclusive representative for the sale of Marveco Live Centers.

**Leo E. Jacobs**, former executive vice president and director of Charles H. Besly and Co., Chicago, became the president of Titan Abrasives Co., Chicago, on Jan. 1, 1949.

The appointment of **M. J. L. Schulte** as general sales manager of Stow Manufacturing Co., Binghamton, N. Y., is announced by C. F. Hotchkiss, Jr., president of the firm.



M. J. L. Schulte

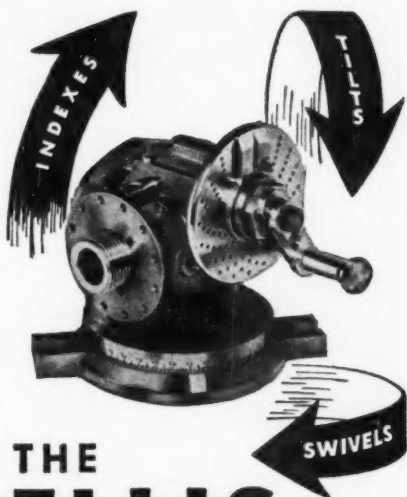


Harry Reichert

• • •

**Frederick U. Conard**, president of Niles-Bement-Pond Co., West Hartford, Conn., recently announced the appointment of **Harry Reichert** as acting manager of foreign sales for the company.

**Chester E. Lang**, vice-president in charge of sales for the Apparatus Department of General Electric Company, recently announced the appointment of **A. B. Hines**, as manager of the newly formed Michigan District of G. E. **V. J. Snyder** and **C. M. Dunn** were appointed as assistant managers of the new district.



## THE ELLIS DIVIDING HEAD

Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with  $6\frac{1}{2}$ " normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.

 **NICHOLS-MORRIS  
CORPORATION**

42-A CHURCH STREET,  
NEW YORK 7, N.Y.



**SUPERFINISHED I. D.'s  
of UNIVERSAL DRILL  
BUSHINGS wear longer—  
save you money**

**UNIVERSAL  
ENGINEERING  
COMPANY**

**FRANKENMUTH  
10, MICHIGAN**



Holcroft & Company, Detroit, builders of heat treat furnaces, announce the appointment of **Ruel T. Cadwell** as president. Other appointments include **Walter H. Holcroft** as executive vice president; **C. H. Martin** as vice president in charge of the Chicago office; **Robert H. Cadwell** as treasurer; and **A. W. Griger** as assistant secretary.

The L. G. S. Spring Clutch Corporation, Indianapolis, have established two additional sales offices: **L. R. Twyman & Associates**, Fisher Building, Detroit 2, Mich., and **Van Riper Engineering, Inc.**, 4 Station Square, Rutherford, N. J.

Creation of a new vice presidency of Allegheny Ludlum Steel Corporation, Pittsburgh, and the appointment of **Robert M. Arnold**, a director, to the position, was announced recently.

**Leonard Kebler**, chairman of the board, Ward Leonard Electric Co., Mount Vernon, N. Y., was recently re-elected a board member of the National Industrial Conference Board for 1949.

The appointment of **Leonard H. Loufek** as industrial manager of the Central District for the Westinghouse Electric Corporation, succeeding **C. H. Weaver**, who has been named manager of the company's newly formed Atomic Power Division, has been announced by **J. K. B. Hare**, vice president.

The appointment of **F. R. Benedict** as manager of the headquarters engineering departments of the Westinghouse Electric Corporation was announced recently by **A. C. Monteith**, vice president in charge of engineering.

The appointment of **William A. Beatty** as manager of the Westinghouse Electric Corporation's Feeder Division, has been announced by **T. I. Phillips**, vice president in charge of the East Pittsburgh works.

Promotion of **Robert M. Whitney** to the position of advertising manager of the Automatic Transportation Co., Chicago, has been announced by **Elmer F. Twyman**, general manager.

**C. M. Murray Limited**, 306 Foy Building, Toronto, Ontario, have been appointed exclusive representatives for Hydro-Line Air and Hydraulic Cylinders and Special Machinery in the Provinces of Quebec and Ontario in Canada.



Milton J. Steffes

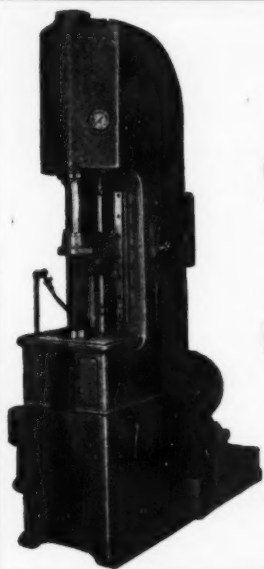
**Milton J. Steffes** has been promoted to general sales manager of Super Tool Co., Detroit 13, Mich., it has been announced by **Gordon J. Birgbauer**, company president.

**Marcus Transformer Co., Inc.**, Hillside, N. J. announces the appointment of the **E. B. Cook Co.**, San Francisco, Calif., as their territorial representative for Northern California, according to a recent statement by **Alvin Marcus**, company president.

The appointment of **J. C. Fink** as manager of the industry engineering department of the Westinghouse Electric Corp. Pittsburgh, was announced recently by **A. C. Monteith**, vice president in charge of engineering.

**Laurence I. Wood** has been named assistant general counsel of the General Electric Company, **Charles E. Wilson**, president, has announced.

**Edward L. Dreyer** was elected vice president in charge of sales and advertising for **Adamas Carbide Corp.**, Harrison, N. J.



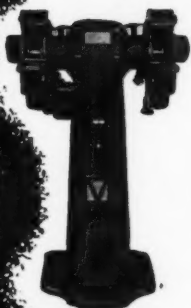
## The New *Guided Ram* High Speed Hydraulic Press

**For Fast Assembly and Broaching**

**WRITE FOR BULLETIN 357-11**

**GREENERD ARBOR PRESS CO.**

**Nashua, N. H.**



## FOR EFFICIENT GRINDING

The narrow type pedestal grinder . . . like all Marschke Grinders . . . is built for maximum cutting with minimum wheel wear. Smooth, true spindle rotation is assured by careful attention to wheel flanges, spindle designs, bearing assembly, motor mounting and power transmission. Marschke Grinders give you what you want in grinders—more rapid metal removal, longer wheel service, longer machine life, less maintenance, time-saving operating conveniences, extra safety and reliability under toughest conditions. Write today for more details on the Narrow Type Pedestal Grindaer or others in the COMPLETE Marschke line . . . wide type pedestal and floor stand grinders and buffers, Heavy Duty Swing Frame and the "In-Between" Grinder.

Write today  
for complete  
details

**VONNEGUT MOULDER  
CORPORATION**

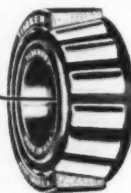
**1805 Madison Avenue**

**Indianapolis, Indiana**

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

235

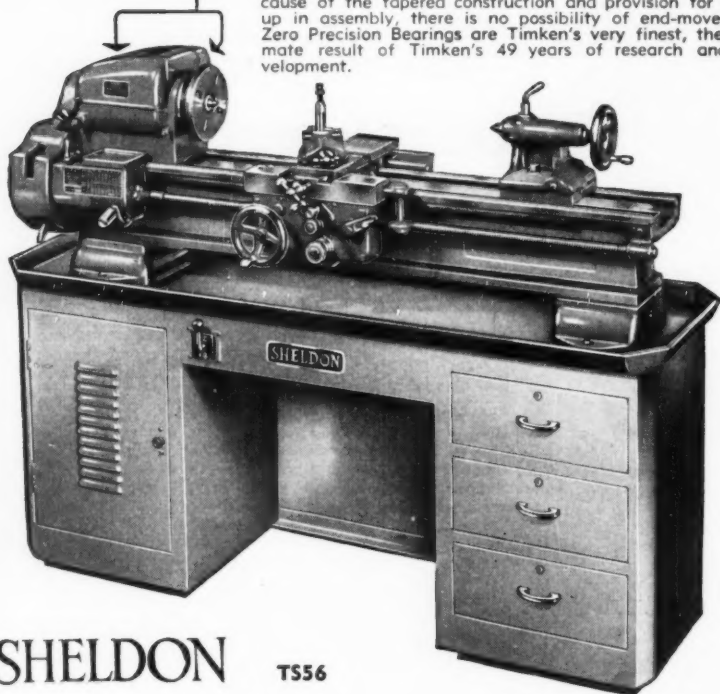
# TIMKEN *Zero precision bearings* give **SHELDON** LATHES **GREATER ACCURACY**



Because the spindle of the **Sheldon TS56** is mounted on **Timken Zero Precision Bearings** extreme accuracy, higher machining speeds and lower production costs are insured.

**Timken Zero Precision Bearings** are by far the most accurate tapered roller bearing that can be made in regular commercial production. Runout or eccentricity is restricted to less than .00015 of an inch. Cups and cones of **Timken Zero Precision Bearings** are matched and shipped as a complete unit.

Due to the line contact between the rolls and races, the spindle is firmly supported — no chance of deflection. Because of the tapered construction and provision for take-up in assembly, there is no possibility of end-movement. **Zero Precision Bearings** are **Timken's** very finest, the ultimate result of **Timken's** 49 years of research and development.



## SHELDON TS56

11 1/4" Swing  
1" Collet Capacity  
56" Bed  
Zero Precision Bearings

# SHELDON MACHINE CO. Inc.

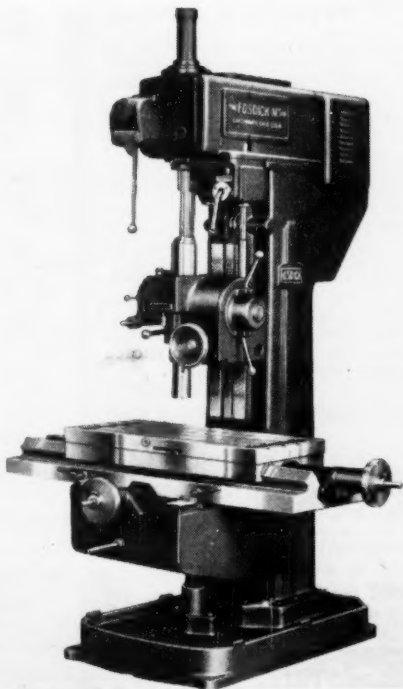
Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers  
4242 N. KNOX AVENUE • CHICAGO 41, ILLINOIS. U. S. A.

# *What's New in* **METALWORKING**

## **FOSDICK SIMPLIFIED UPRIGHT DRILL**

A simplified upright drill has been added to the line of drills manufactured by the Fosdick Machine Tool Co. The elimination of speeds and feeds makes it economically adapted to a wide variety of production and maintenance work. Nine spindle speeds in geometrical progression with a range of from 37 to 600 r.p.m., to 100 to 1600 r.p.m., may be obtained by a single direct reading lever. Other ranges are accessible by changing the initial drive gear or the motor speed.

The drive from the motor goes directly through a gear and pinion to the main gear train. Starting, stopping and reversing of the spindle are obtained electrically by the use of micro switches, which in turn, operate a magnetic reversing starter. When this lever is placed in neutral position, an electric brake is applied which stops the spindle instantly. This lever is placed in front of the sliding head.



The drill is provided with four feeds, all of which are controlled by a single

## "LET'S LOOK FOR TROUBLE"



says **Chip Wright**

"Looking for trouble is a necessary part of efficient operation. The most efficient shop is one in which troubles are reduced to a minimum.

"A plant honing cylinder blocks was considered trouble-free when averaging 9.6 blocks per stone and getting a fair finish. When a change of honing oil made it possible to hone 15.4 blocks per stone and get a better finish, it was realized there had been *trouble* before this profitable change was made.\*

"That's what I mean by, 'Let's look for trouble.' Another way of stating it is: 'Where can we find opportunity for improvement?' Frequently the biggest opportunity lies in the choice of cutting fluids."

—Chip

\*The change that improved this honing operation was a mixture of D. A. Stuart's ThredKut 99, which is easily mixed or blended whenever a special operation calls for its unusual qualities. Ask for a booklet on ThredKut 99.

**STUART** service goes  
with every barrel

**D. A. Stuart Oil Co.**  
EST. 1883 LIMITED

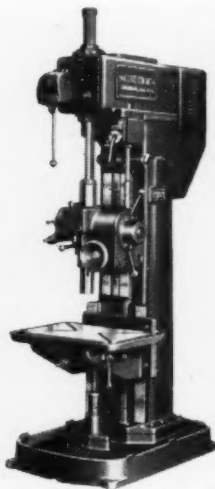


2739½ South Troy St., Chicago 23, Illinois

lever with direct reading index. The range of feeds is from .002" to .010", or .004" to .020". Other feeds can be obtained by changing this gear train.

All gears in the speed and feed box are made of alloy steel, heat treated and shaved. These gears are mounted on ground splined shafts and revolve in anti-friction bearings; the entire unit operates in a bath of oil.

The sliding head is of heavy duty design. The sleeve has a bearing which is equal to the head bearing on the column. The spindle is counter-balanced by a weight placed inside of the column. An opening in the back of the column is provided to add additional weight, if heavy drills or drill heads are placed on the spindle. The head is counter-balanced by means of a worm and worm wheel, which are operated from the front of the machine.



This unit is built in both box and round column types. Multiple spindles up to as many as six on a base can be obtained. The Fosdick jig borer table, slide and knee, can be added to this machine, providing a combination drill and jig borer.

The accuracy of this machine is held

to .001". The table and slide are moved by means of accurately ground screws. Large dials are placed on the end of these screws for positioning the table and slide.

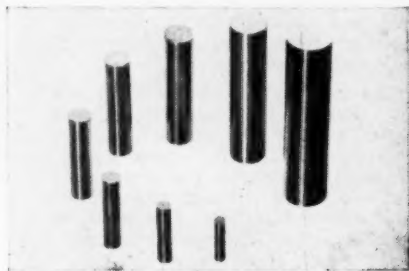
For complete specifications on these Upright Drills, write the manufacturer: **Fosdick Machine Tool Co., Dept. BB Cincinnati, Ohio**

#### NEW LINE OF SOLID CARBIDE CYLINDERS

A standardized line of solid carbide cylinders, comprising 115 sizes, both ground and unground, has been announced by Carboloy Company, Inc. Among the wear-resistant uses of Carboloy cylinders are burnisher rolls, knurl roll pins, locating devices, and plunger ends. The cylinders may also be used as round bits for "insert" tools used for semi-finish facing, straddle facing, and multiple turning of metals and many non-metallic materials.

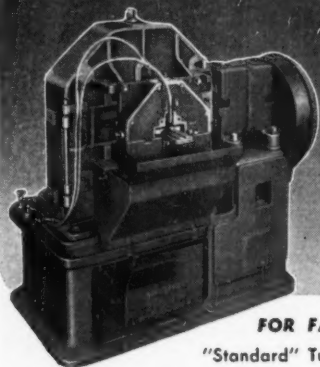
The cylinders range in diameter from  $3/32"$  to  $1/2"$ , and in lengths ranging from  $3/16"$  to  $1 1/2"$ . Diameters ranging from  $3/32"$  to  $1/4"$  are in steps of  $1/32"$ ,

while diameters ranging from  $1/4"$  to  $3/8"$  are in steps of  $1/16"$ . The lengths vary in  $1/16"$  graduations. With few exceptions, the complete range of sizes is available in Carboloy grades 44A, 55A, 78, 78B, 831, 883, 905, and 999, in both ground and unground conditions.



For complete information on this new standardized line, write:

**Carboloy Company, Inc., Dept. BB  
11139 E. 8 Mile Road  
Detroit 32, Mich.**



*"Standard"*  
**TURKS HEADS**  
by **FENN**

#### FOR FAST PRODUCTION OF SPECIAL ROLLED SHAPES

"Standard" Turks Heads convert rod stock to plain and ornamental shapes in one speedy operation. These adjustable draw plates are offered in a wide range of capacities, with friction or power driven rolls, in tandem mountings and with special attachments. They hold dimensions within very close tolerances and produce increased tensile strength in the finished shape. Write for Bulletin TH.

#### THE FENN MANUFACTURING COMPANY

1846 BROAD ST., P. O. BOX 235, HARTFORD 1, CONN.

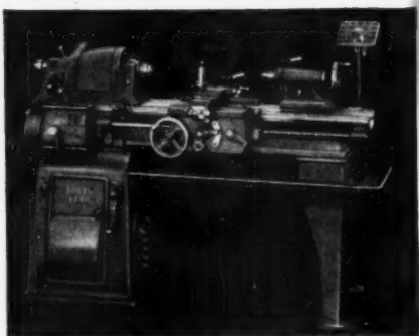
Manufacturers of "Standard" Power Presses to 500 Tons • Rolling Mills • Swagers  
Turks Heads • Also Fenn Special Machinery

## NEW 13" SWING LATHE HAS 1" COLLET CAPACITY

A new series of 13" swing Tool-room and Quick Change Gear Lathes is now in production by the South Bend Lathe Works. Its new features include an improved headstock spindle with increased bore and collet capacity, new tailstock base with improved bed way wiper system, and new one-point oiling system for reverse lever bracket and twin gear bearings.

The new headstock spindle has a  $1\frac{3}{8}$ " bore and will take No. 5 South Bend Collets which have a maximum capacity of 1". This increased spindle capacity permits machining  $1\frac{3}{8}$ " bar stock fed through the spindle and a suitable chuck. Bar stock up to 1" may be fed through the spindle and No. 5 South Bend Draw-in Collet Assembly. The bearing surfaces on the spindle are superfinished to a smoothness of 5 microinches (profilometer reading .000005" rms) and have a hardness of 56 to 61 Rockwell C.

The spindle turns in split sleeve bronze alloy bearings which have



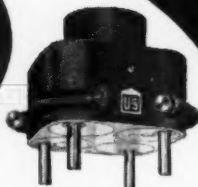
proved durable and efficient for precision lathe operations. The sleeves are bearingized to provide the best possible surface finish and final precision fit. Individual oil reservoirs and a capillary oiling system provide a film of filtered oil. The oil is returned to the reservoirs from the bearings so that only an occasional replenishing is required.

## Hard to Please?

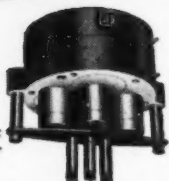
If you're looking for really fine quality heads, available at the lowest possible price, write or wire us today. Whatever your requirements, we can supply you.

IMMEDIATE DELIVERY!

We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.



Single eccentric type for equally spaced holes on bolt circles.



Double eccentric type for irregular spacing.



Universal joint with slip spindle fixed locating plate.



SINCE 1915

**UNITED STATES DRILL HEAD CO., CINCINNATI 4, OHIO**

The new tailstock base wiper system is designed to keep the bed ways for the tailstock base free from chips and grit. The tailstock alignment remains accurate, and the bed ways are not subject to wear. The new one-point oiling of the reverse lever bracket and the twin gear bearings saves maintenance time and makes more certain that the twin gear bearings receive proper lubrication.

The underneath motor drive (see illustration) is a fully enclosed, self-contained unit, providing a wide range of spindle speeds. A precision belt tension adjustment is provided; the belt drive to the spindle is silent in operation and develops smooth, vibrationless power.

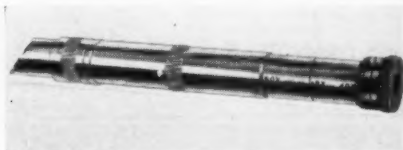
The general specifications of the new 13" lathes include a 13 $\frac{1}{8}$ " swing over the bed; a 7 $\frac{3}{4}$ " swing over the saddle cross slide; 48 pitches of screw threads, from 4 to 224 per inch, both r.h. or l.h.; 48 longitudinal power feeds, ranging from .0015" to .0841", r.h. or l.h.; 48 power cross-feeds .0006" to .0312". The lathes are provided with 8 spindle speeds, ranging from 34 to 875 r.p.m.; either 4, 5, 6, or 7-foot bed lengths. The hole through spindle is 1 $\frac{3}{8}$ " in diameter, and the maximum collet capacity is 1".

Catalog No. 73 describing the new 13" lathes is available upon request to:

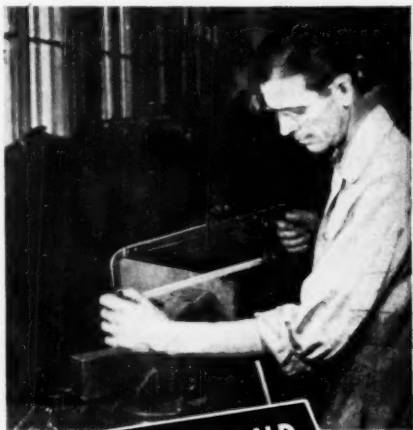
South Bend Lathe Works, Dept. BB  
384 E. Madison St.  
South Bend 22, Ind.

#### PRECISION POCKET MICROSCOPE

Developed by the Buhl Optical Co., this pocket microscope adjusts to 40X 50X and 60X. A precision instrument, the pocket microscope is the equivalent



of a standard laboratory microscope. It is useful for shop, mill, laboratory and office use. The unit, no larger than an ordinary fountain pen, draws out at



**SPEED UP HAND  
OPERATIONS...**

*with*

## CAPEWELL TECHNITE HACK SAW BLADES



You can get your share of the big cutting jobs by making deliveries on time . . . and you can meet your important delivery schedules by relying on Capewell's Technite for your hardest cutting jobs. This blade is designed to cut faster and last longer on tough alloy steels. You step up your production yet keep costs down.

This same blade in the power sizes also cuts costs on machine production. Ask your distributor for Technite.

The **CAPEWELL**  
1881  
Manufacturing Co.

HARTFORD 2, CONN., U.S.A.

**METAL WORKING CRAFTSMEN FOR OVER 65 YEARS**

the eyepiece end for power adjustment; it is equipped with a hooded reflector and knurled collar for fine focusing at object end. The diameter is  $\frac{3}{4}$  inch.

The instrument has fully corrected achromatic objective; it is provided with an integral light reflecting mirror. Built in vernier focusing, it has a 20 millimeter focal length. The item is offered on five day free trial. Write:

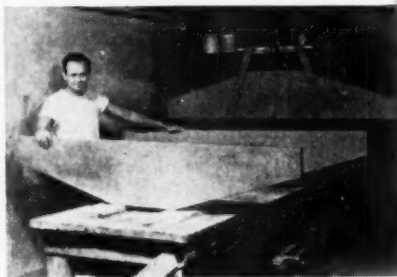
**Buhl Optical Co., Dept. BB**  
1009 Beech Ave.  
Pittsburgh 12, Pa.

#### **SIX-FOOT GRANITE STRAIGHT EDGES**

The 6-foot long granite straight edges announced by Rahn Granite Surface Plate Co., are made to a tolerance of .00005". A precision method of generating the edges assures this extreme accuracy. These dependable straight edges are produced with the same black granite of Rahn black granite surface plates.

Literally millions of years of heat treating and normalizing by nature has produced this completely stress relieved material that is harder than hardened

tool steel. The straight edges will not warp due to temperature changes or shock. If accidentally struck by a sharp object, no compensating hump will be raised at the point of impact. They require no oiling nor cleaning. Metal



abrasives can not become imbedded in the surface and there is no danger of lapping articles on which it is used. For detailed information, write:

**Rahn Granite Surface Plate Co.**  
Dept. BB  
Dayton, Ohio

**SAVE TIME and MONEY with**



## **MARSHALLTOWN THROATLESS SHEARS**

Here's the shear that offers best performance features. Cutting speed 6' per minute. High grade tool steel cutters. Prompt shipment.

*Send Today For Special  
Information Bulletin*

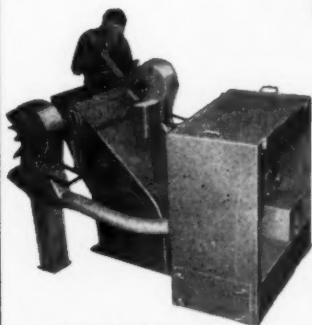
**MARSHALLTOWN MANUFACTURING CO.**  
910 E. Nevada St.      Marshalltown, Iowa

\* DUCTLESS DUSTKOPS can usually be installed in twenty minutes.

# STOP DUSTS

HOW?... with **DUSTKOP**

WHEN? ... within 20 minutes\*



Model 1150 illustrated

■ **DUSTKOP** stops abrasive and fire-hazardous wood, rubber and similar combustible dusts. **DUSTKOPS** are firesafe. (Built of steel and non-inflammable spun glass). **DUSTKOPS** have high suction, big dust storage capacity, with space-saving compactness plus high efficiency dust separation. Unit-type **DUSTKOPS** save power: operate only when needed. Complete line of **DUSTKOPS** for all dusts.

**AGET-DETROIT CO.**

205 Main at Washington  
Ann Arbor, Michigan

Send Us the Details of Your  
Dust Problem \_\_\_\_\_

*Severance*

**TUBING CUTTER GROUP - FOR FAST DEBURRING OF EVERY MACHINEABLE TYPE TUBE ...**

**TUBE DEBURRING  
CUTTERS (Standard)**



18 Standards in H.S.S. and  
Cemented Carbide

**ADJUSTABLE TYPE**



Adjustable from 1/2" -  
2-1/2" O.D.—for short runs

**TUBE CHAMFERING  
MILLS**



23 sizes from 3/16" - 2-1/2"  
O.D. — Chatterless

**SOLID TUBE  
DEBURRING CUTTERS**



16 sizes from 1/4" - 1-5/8"  
O.D. — H.S.S. and Carbide

**SPECIAL  
TUBING CUTTERS**



From light hand-deburring up to close tolerance deburring, chamfering, flaring ... For working non-ferrous metal, steel (including stainless) and plastic tubing ... For combining reaming, sizing or flaring with end facing and deburring ... Whatever the operation or material, Severance HSS and Cemented Carbide Tube Deburring Cutters are TOPS in performance—long life—economy.

**COMPLETE REGRINDING SERVICE BY NEW TOOL CRAFTSMEN SAVES YOU MONEY!**

**SEVERANCE TOOL INDUSTRIES INC.**

722 IOWA STREET

SAGINAW, • MICHIGAN

## EXCELSIOR DEVELOPS OUTSTANDING SHEET GRINDER AND POLISHER

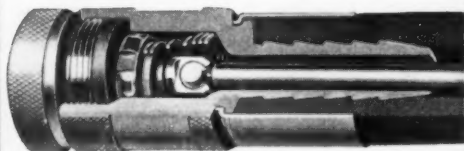
The new Excelsior Sheet Grinding and Polishing Machine, Model 27-K, has recently been placed on the market by the Excelsior Tool and Machine Co. The new unit, the manufacturer's latest development in the field of grinding and polishing both light and heavy gauge sheet metal, is claimed to be fool proof. It is mechanically operated, and is provided with no electric eye, compressed air nor hydraulic appliances; all complicated adjustments are avoided.

The machine is operated at a minimum grinding belt cost, since paper belts are used. The belts are 16-foot, endless type, obtainable from abrasive belt manufacturers, and may be of any width and grit. The standard sheet polishing capacity may be any width, length and gauge up to 48" wide, and 144" long. The carriage travels 58 lineal feet per minute, and is adjustable to any length sheet up to maximum capacity.



It is operated by a 2 h.p. reversible motor, which stops automatically at the end of each stroke, raising the rub-

### **Air-O-chek** The Valve with the internal fulcrum lever



### **PROVEN USES**

- AIRGUNS
- SPRAY VALVES
- CASING FLUSHING VALVES

*Used For Air Or Fluid*

Available in Several Models and Sizes. Ingenious Lever arrangement makes conventional packing stem and gland unnecessary. An invention in valve means. Write for more details.

## **AIR-WAY PUMP & EQUIPMENT CO.**

1054 N. KILBOURN AVE.

CHICAGO 51, ILL.

ber pressure roller, for removal of the polished sheet. The motor is direct-connected to the driving pulley on the polishing head. The front drum is adjustable to provide for variations in the grinding belt lengths, and for centering the grinding belt. The speed of the grinding belt, which is powered by a separate 30 h.p. motor, is 3500 s.f.p.m.

All the mechanically controlled adjustments are operated from a central location. A positive clamping fixture permits overtravel of the carriage, preventing damage to the grinding belts or the rubber contact roller, on which any pressure from 200 to 600 lbs. is applied by removable weights, assuring positive regulated pressure over the entire surface of the sheet.

Since excess pressure of light gauge sheets will discolor and cause them to buckle, the friction temperature is reduced by applying a lubricant, the formula for which is furnished with the machine.

The new unit occupies a floor space 5 feet wide by 30 feet long; height is 7 feet. No concrete foundation is necessary. For complete specifications, write:

**Excelsior Tool & Machine Co.**  
3100 Ridge Ave., Dept. BB  
East St. Louis, Ill.

#### **ELECTRIC FURNACE WITH ACCURATE TEMPERATURE CONTROL**

A new floor model electric furnace designed to give precision temperature control is introduced by the K. H. Huppert Company. Designed for tool and die work, hardening and drawing (and in the laboratory for ash analysis), the new furnace provides practical heat control in a range from room temperature up to and including 2000°F.

Temperature control on this furnace, the No. 11 FM Special, is achieved by means of two Huppert Infinitrols; these step-less input controllers are mounted onto the base of the furnace (see illustration), and another control is mounted beneath the furnace itself; all controllers are thus integral parts of the unit, requiring no external mountings to be made by the customer.

The furnace has two sets of heating elements. The top and bottom comprise

## **Save REAL MONEY on these EASTERN Tool Bargains!**

### **• CARBIDE TIPPED TOOL BITS**



**80c  
EACH**

$\frac{1}{4}$ ", 5/16",  $\frac{3}{8}$ ",  
7/16",  $\frac{1}{2}$ "

**HIGHEST  
GRADE  
TUNGSTEN  
CARBIDE  
ONLY!**

• Available in any size,  
any shape, in Right  
Hand, Left Hand, Round  
and Square Nose.

#### **UNUSUAL VALUE!**

### **• NEW ...**

#### **18" VERNIER HEIGHT GAUGE**

OUR PRICE

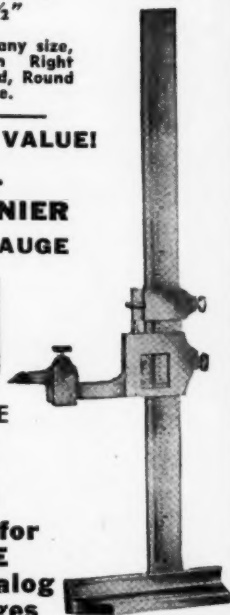
**\$60.00**

YOU SAVE

**\$70.00**

(Supply  
Limited!)

• Send for  
**FREE**  
**Tool Catalog**  
**128 Pages**



**EASTERN Tool Supply Company**

174 Grand Street New York 13, N. Y.

# The most versatile fixture for quick accurate indexing ...SUPER-SPACER

This fixture allows rigid control of accurate machining operations within its scope at speeds and feeds limited only by the capacity of the holding means and the power of the machine.

Standard mask plates have 2, 3, 4, 6, 8, or 12 divisions. Specials made to order. All Super-Spacers come complete with mask plates, Universal chuck and chuck wrench. Write for Bulletin S-101.

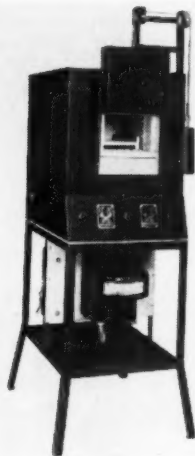


**HARTFORD**

*Special*

The HARTFORD SPECIAL MACHINERY Co., Hartford 5, Conn.

one set, with the two sides making up the other. Each set is controlled by one of the Infittrols, with the temperature governed automatically by the third control, a Wheelco Capacitrol. With this unit, it is possible to control temperatures as low as 100°F. with the same accuracy as higher temperatures are controlled in ordinary furnaces.



The unit's construction permits temperatures below the standard range of electric furnaces; in many instances this furnace can be used as an oven to control extreme low temperatures. For drawing purposes, requiring temperatures of 350° to 500°F., both sets of elements can be placed in low position on the Infittrols, with the Capacitrol providing temperature uniformity. For steel hardening, the furnace operates over the normal range of 1400° to 2000°F.

Inside dimensions of this furnace are 8" wide, 6" high and 12" deep. Overall dimensions are 24" wide, 29" deep and 68" high. In the bench model, or No. 11 BM, no fused switch box is supplied, but the unit is wired to terminate in an outlet box in back of the furnace.

For further information, write:

**K. H. Huppert Co., Dept. BB**  
6830 Cottage Grove Ave.  
Chicago 37, Ill.

## B & S ELECTRALIGN FOR ELECTRONIC TABLE ADJUSTMENT

Setting the swivel table of a grinding machine to grind a straight shaft or an exact taper always has been a difficult cut-and-try operation. To make this a straight-forward, simple and quick adjustment, the Brown & Sharpe Electralign has been developed.

The Electralign ignores the condition of the table pivot, table wear which may occur with time, the weight of the workpiece and the location of the headstock and footstock on the table. True swivel movements are indicated without relation to these variables.

The Electralign locates a strain gage measuring head at each end of the sliding table and measures the movements of the ends of the swivel table. By making measurements with strain gages, high sensitivity is obtained and displacements of .0001" are easily detected and amplified to well spaced graduations on an indicating scale. As the amplifier has a scale which is set for the work length, deflections are direct reading without interpolation or transposition.

In using the Electralign, the operator makes a trial grind and measures the work to determine error in taper. He then sets the amplifier selector knob to the axial length over which he has just made his taper measurement and brings the measuring head spindles at each end of the table in pressure contact with the swivel table anvils. A knurled adjusting screw, located on the front of the right-hand measuring head, then is turned to make the ampli-



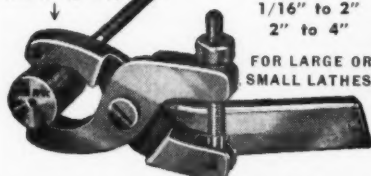
fier meter pointer read as many ten-thousandths off zero as the work was off taper. When the swivel table is moved through its regular adjusting mechanism enough to make the meter pointer read zero, the error in taper has been corrected. This correction may be accomplished during the grinding operation.

Brown & Sharpe Universal, Plain and No. 13 Universal and Tool Grinding Machines are obtainable with the Electralign. Write for 8-page, descriptive bulletin to:

**Brown & Sharpe Mfg. Co., Dept. BB  
Providence 1, R. I.**

### KNURL it Easily, Quickly, Safely

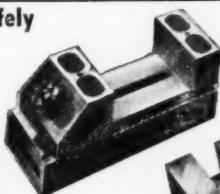
Use any Standard  
Knurls  $\frac{3}{8}$ " x  $\frac{3}{4}$ "



Two Sizes:  
1/16" to 2"  
2" to 4"

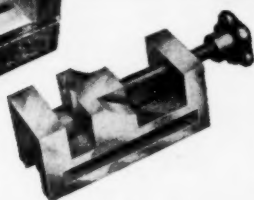
FOR LARGE OR  
SMALL LATHES

**Joseph B. Fakes & Co., Royal Oak, Mich.**



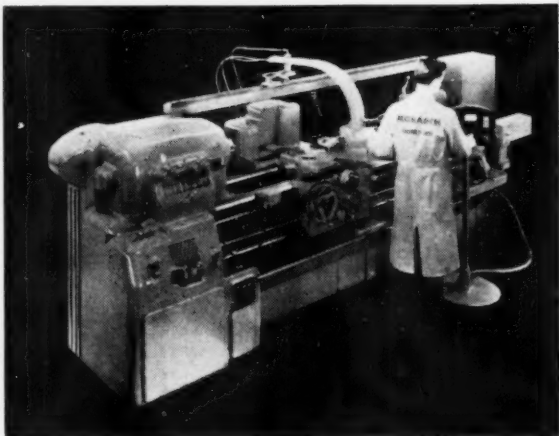
6 Sizes  
Priced To Sell

### TOOLMAKERS' PRECISION VISES



## MONARCH LATHE FEED SELECTOR AND AUTOMATIC CYCLE UNIT

Combining the features of a modern flexible engine lathe, the high production economies of automatic cycling, and template control of size and contour, a new turning machine attachment known as the "Air-Gage Tracer-Packaged Unit" is announced by The Monarch Machine Tool Company. This unit is designed for application to Monarch 16" and 20" Series 60 Engine Lathes, 20" Model "M", 25" Model "N" and 32" Model "NN" Engine Lathes. Based on reports already accumulated, it is capable of increasing production from 8 to 10 times over that heretofore obtainable with conventional engine lathes.

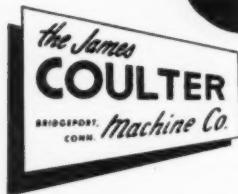


Used with the Air-Gage Tracer, introduced in 1947, this new development provides an individual motor drive for

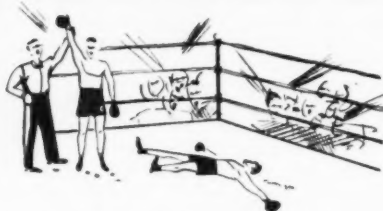
it  
isn't

just

Luck



We welcome your inquiries.



Luck doesn't make a winner . . . It isn't just luck that finds COULTER MACHINES successfully at work all over the world. It's the perfect combination of more than half a century of "on-the-job" experience, plus competent personnel that know threading equipment problems, and how to solve them.

COULTER has "been-in-there" since 1896.

- ★ Thread Miller. For long and short threaded parts, internal, and external threads. Multiple and single cutter types.
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**MACHINES TO BEND COLD PIPE, CONDUIT, BOILER TUBING  
AND SOLID BAR . . . BENDING TABLES ALSO AVAILABLE**



Above: Hand powered Type A-30 . . . up to 180 bends . . . all sizes from  $\frac{1}{2}$ " to 2".

Only 7 parts. World's fastest, simplest machine. Note assortment of bending dies . . . this process makes shorter tangents than any other. Occupies only 18" by 18" floor space!

Other Sizes Available

Factory and Main Office:

9 Furnace Street      Poultney, Vermont

## RADIANT HEAT BENDS

For residential work—at 6" and 9" radius bends on  $\frac{1}{2}$ " and  $\frac{3}{4}$ " pipe.

For industrial sizes—at 6" and 9" radius bends on 1" and  $1\frac{1}{4}$ " pipe.

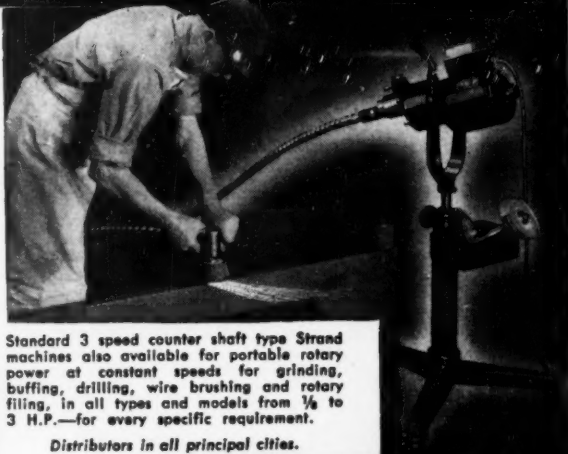
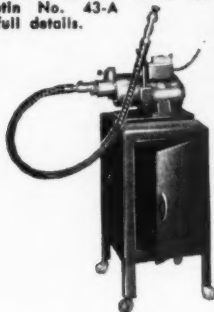
All the above bends and sizes are specified and accepted by most heating engineers and contractors.

Furnished as extras if required on our Type A-30.

**"American"**  
PIPE BENDING MACHINE  
Company INC.

## NEW 4-SPEED *Strandflex* FLEXIBLE SHAFT MACHINES

The Strandflex 4-Speed gear drive employs a patented, new type of quick change gear drive utilizing 4 POSITIVE speeds by a unique and easy method of instantly changing from one speed to another. Powered with totally enclosed ball-bearing motors (having speeds from 850 to 9000 R.P.M., depending on motor) means years of smooth, trouble-free service. Send for Bulletin No. 43-A for full details.



Standard 3 speed counter shaft type Strand machines also available for portable rotary power at constant speeds for grinding, buffing, drilling, wire brushing and rotary filing, in all types and models from  $\frac{1}{8}$  to 3 H.P.—for every specific requirement.

Distributors in all principal cities.



**N. A. STRAND & CO.**  
5001 NO. WOLCOTT AVE.  
CHICAGO 40, ILL.

the lathe carriage feed. Easy selection of the exact feed best suited to any job and automatic cycle operation are obtained. Except for loading and unloading the machine and starting the cycle, no attention from the operator is required, enabling him to attend two or more machines without loss of work quality.

The Packaged Unit includes an electronically controlled motor drive coupled to the right end of the leadscrew. The control system provides stepless variation of the carriage feed rate in a range of  $\frac{1}{2}$  to 20" per minute. Rapid traverse return of the carriage is fixed at 100" per minute.

A floor stand carrying the control panel for the unit may be positioned for operator convenience. The panel contains switches for energizing the control, starting, stopping and reversing the cycle. Setting of the infinitely variable feed is also done here.

If the lathe has been operating as a conventional engine lathe, conversion to automatic cycling can be made in three minutes or less.

The Air-Gage Tracer-Packaged Unit combination is said to be particularly suited to multiple diameter and contour turning. The finish imparted to the work by the Air-Gage Tracer frequently eliminates the need for subsequent grinding operations; and where grinding is required, the grinding allowance may generally be reduced by one-half. For complete information, write:

Monarch Machine Tool Co., Dept. BB  
Sidney, Ohio

## CUNNINGHAM REVERSE MOLD STAMPS

A new range of S-T-M Safety Stamps for reproducing raised letters and figures on plastic, glass or rubber products is announced by the M. E. Cunningham Company. Made with 30° bevel characters, these new stamps are designed to produce deep, clear-cut stamping in metal molds for reproduction on finished molded products.



S-T-M Stamps are made from Meco Safety Steel which assures long service and provides non-spalling and non-mushrooming safety features. Suitable styles for any marking requirement can be furnished, since character sizes range from  $\frac{1}{32}$ " through  $\frac{1}{2}$ "; all stamps from  $\frac{1}{16}$ " and larger are a-



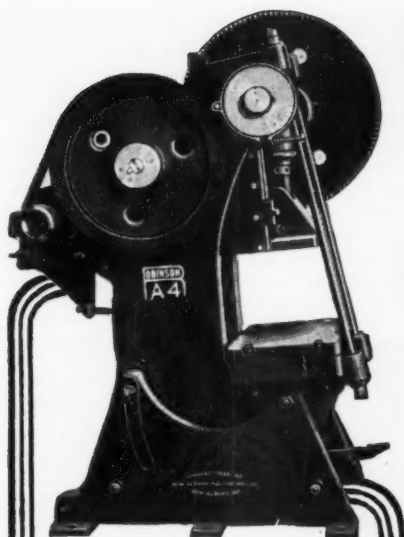
**"GEARED TO PRODUCTION"**

**begins with BEST GEARS!**

**Abart GEARS** cut to your specifications by long experienced specialists, meet that definition on all points! Spur, worm, bevel, helical, internal. Any gear material. No stocks. Send B/P or samples. Prompt delivery.

**Abart GEAR & MACHINE CO.**

4832 W. 16th Street  
Chicago 50, Illinois  
Phone ROckwell 2-2828



## The ROBINSON *Inclinable* PUNCH PRESS

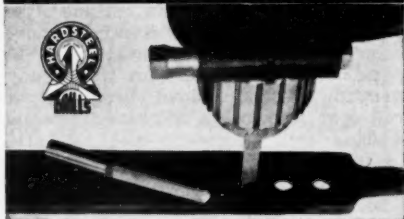
The new and improved Series A Robinson Punch Press is noted for safe, dependable operation. Sturdily built and employing finest construction features, a Robinson Series A offers years of trouble-free operation at minimum maintenance cost. Five sizes now available for immediate delivery.

**New Albany Machine Mfg. Co.**  
NEW ALBANY, IND.

**ROBINSON**

*Inclinable*  
**PUNCH PRESSES**

## Drill Hardened Steels without Annealing with "HARDSTEEL"



Don't let anyone tell you that hardened steels must be annealed before drilling, countersinking, counterboring or reaming.

With "HARDSTEEL" drills you can produce accurate, smooth holes in steels hardened by any process—oil-hardened, water hardened, cyanided, nitrided, and they work equally well on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" drills used with standard drill presses cut costs in production shops because parts drilled after hardening always match at assembly. In service shops they save time and material and permit engineering changes calling for additional drilling to be made after parts are full hardened.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are now functioning in thousands of plants in parts recovery operations.

**You Harden It — We'll Drill It —  
with "HARDSTEEL"**

**"HARDSTEEL" Tool bits make  
faster, deeper cuts on steels  
and non-ferrous alloys.**

**BLACK DRILL CO., Division Black Industries**  
1374 East 222nd Street • Cleveland 17, Ohio

**"HARDSTEEL"**

DRILLS • TOOL BITS • SPECIALS

available in condensed, medium and extended widths.

The letters and figures are also furnished in steel type, with reverse style characters, for use in multiple character stamping in flat molds, and in regular style characters for use in any marking machine, heat branding or roll leaf imprinting machines. Special designs and trademark dies can also be furnished. For complete data sheets on the S-T-M Stamps, write:

**M. E. Cunningham Co., Dept. BB**  
228 E. Carson St.  
Pittsburgh, Pa.

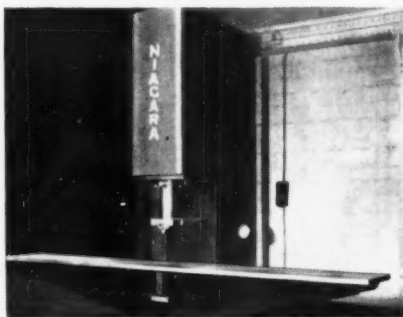
#### **MULTIPLE PURPOSE HYDRAULIC PRESS**

Straightening, forming, broaching, forging and assembling operations are all within the range of work handled by the new Hydraulic Metal Working Press announced by Niagara Machine & Tool Works.

With the Niagara Hydro-Touch Control, approach speed, the applied pressure of the ram and the return speed are governed by the movement of one lever conveniently located to give finger tip control. This enables the operator to feel his way into a job, and gives a smooth fast operating cycle.

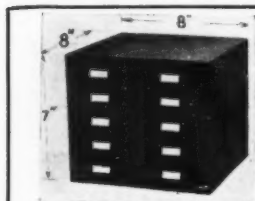
The speed of the ram approach is proportional to the initial movement of the lever. Hence the operator may approach the job at maximum speed and slowly advance the ram onto the work. When the punch first touches the work, the pressure exerted is practically non-existent. Further movement of the control lever applies pressure on the

work in proportion to the amount of lever movement. The operator may apply any pressure up to the capacity of the press by moving this lever the desired amount. This feature is important in straightening operations because just the right amount of pressure may be applied to remove the distortion. Releasing the lever at any point stops the ram, the lever automatically returning to neutral position. Raising the lever to extreme upward position lifts the ram to top position.



The frame, bed and table are one-piece welded, machined as a single unit to precision limits. Area of bed is 30" x 240". The maximum capacity of 135 tons can be exerted at any point in the 33" of ram travel. Write for catalog to:

**Niagara Machine & Tool Works**  
637-97 Northland Ave., Dept. BB  
Buffalo 11, N. Y.



Pat. Pend.

Each cabinet is equipped with rubber pads to prevent marring and slipping when used singly or when stacked.

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An excellent investment—Olive Green Baked Enamel Finish.

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3 $\frac{3}{8}$ " Wide, 1-3/16" High and 7 $\frac{1}{8}$ " Long.

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An all steel No. 24 Gs. ten drawer small articles cabinet designed especially to fit the needs of those having many items they want at their finger tips.

The unique interlocking construction makes it possible to offer a neat (no unsightly spot welds) cabinet with ten individual free-sliding drawers at a nominal cost.

Each drawer has a combination drawer pull and label holder for indexing contents to insure against loss of items, saving searching time and replacement cost.

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**A NEW METHOD OF REMOVING  
CHIPS FROM BLIND DRILLED AND  
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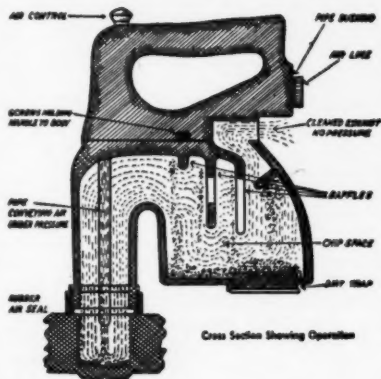
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Eliminate the danger to your workmen from flying chips by removing your cuttings with the BUFFALO PNEUMATIC CHIP GUN. Simply place the nozzle over the hole, release the air by thumb pressure and the cuttings are deposited in the body of the gun.

Available in two sizes:

Model A—For  $\frac{1}{4}$ " to  $\frac{3}{8}$ " dia. holes

Model B—For  $\frac{1}{2}$ " to  $1\frac{1}{2}$ " dia. holes



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**BUFFALO MACHINERY CO., INC.**

838 Grant Street

Buffalo 13, New York

The Bendmore handles material up to  $\frac{3}{32}$ " thick a full 12" wide. Good clean bends up to  $135^\circ$ . The machine is ruggedly constructed of semi-steel castings, the operating cam and steel insert in ram are heat treated to resist wear and give long life. Prompt delivery.

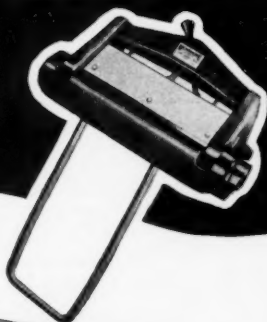
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*Carl Wirth & Son*

1625 CLINTON AVE. N.  
ROCHESTER 5, N. Y.

*Bendmore*

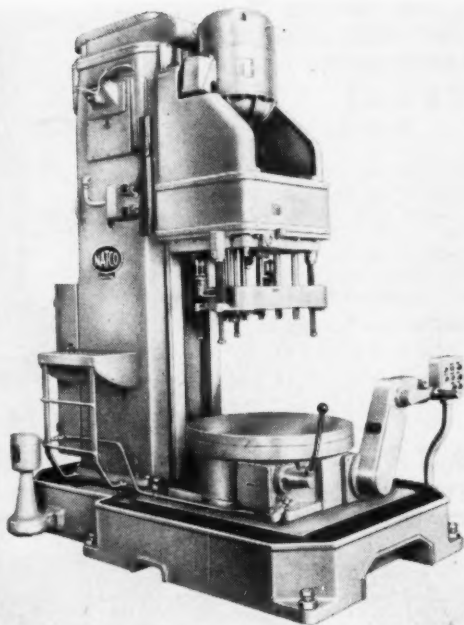
**SELF ADJUSTING  
BENDING MACHINE**



## NATCO SINGLE AND MULTIPLE SPINDLE VERTICAL MACHINES

The newly-developed Natco models C2A, C3A, and C4A Holesteel Vertical machines are production units adaptable for drilling, boring, tapping and similar operations on production lines as well as for general work. The electrically controlled hydraulic feed system provides an infinitely variable feed selection within the specified range. Where provided, change gears permit spindle speed variations. Electrical push-button control provides for routine and set-up control from a central station. Models C2A, C3A (illustrated) and C4A machines are of both Single Spindle and Fixed Center Multiple Spindle Construction.

Each model can be supplied with either large or small base. The small area base is supplied for adjustable table applications or for stationary fixtures mounted on the base. The larger area base is suitable for rotating and sliding type fixture applications. Across the front and along either side of the working area is a coolant channel which drains into the coolant reservoir in the rear section of the base.



Models C2A and C3A Holesteel machines can be supplied with an adjustable knee-type table. The knee, supporting the table top, has long bearings on the column ways. The entire assembly has a vertical adjustment of approximately 12".

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A box section column prevents deflection under the thrust loads encountered. The ways are of close grain, high tensile cast iron. Hardened and ground steel ways are also available. The upper section of the column encloses the hydraulic pressure pumps and all of the hydraulic system piping. The hydraulic feed control panel is located on the right side of this compartment, while on the left is located an inspection cover and protected oil filler opening. The lower section encloses the head counterbalancing weight.

Mounted on an adjustable leaf at the rear, a standard foot mounted motor drives the hydraulic pump through "V" belts. The hydraulic pump is located on the underside of the neck with the hydraulic reservoir, and is flexible, coupled to the drive shaft.

The head slide for mounting the spindle heads is guided on the column ways, and has gib adjustment. The ways are automatically lubricated at each cycle of the head. The single spindle head is direct motor driven and anti-friction mounted. Lever operated sliding gears permit a selection of seven spindle speeds through splined pick-off gears. The gears and bearings are lubricated through a cascade system.

Designed for the individual requirements, the fixed centered multi-spindle heads are anti-friction mounted where center distances will permit. A cascade lubrication system provides adequate lubrication for all bearings and gearing. Combination drilling and tapping heads are provided with an inde-

pendent reversing type motor for the tapping spindle drives. Stub type, heavy duty, or accurate boring spindles are also anti-friction mounted, center distances permitting.

A head traverse power cylinder is mounted between the ways at the top of the column, and through a control system provides a cycle sequence of rapid advance, coarse feed, fine feed, rapid reverse and stop. A delayed reverse can also be furnished, if desired. It provides a dwell at the end of the feeding stroke, and is used for accurate "facing to depth" operations.

A step drilling attachment which allows the drilling of deep holes by increments of depth with a completely automatic cycle, can be supplied. A remote control for set-up use can be furnished at an additional charge. This control provides full remote control, through pushbuttons, for all phases of the cycle — rapid advance, coarse feed, fine feed, and rapid reverse. In connection with the set-up control, a centralized control is used for routine production cycling.

A motor driven centrifugal coolant pump mounted on the left rear of the base provides coolant when required. In production operation, the flow of coolant is automatically stopped except during cycling time. An independent shut-off is provided through an electrical switch.

The electrical equipment is in accordance with National Machine Tool Builders Electrical Standards. The standard equipment consists of two

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8	8 1/2	WILLIAMS	VULCAN	14.42 ea.	9.30 ea.
10	10 1/2	WILLIAMS	VULCAN	19.57 ea.	13.30 ea.
112	12	WILLIAMS	AGRIPPA	8.76 ea.	5.95 ea.
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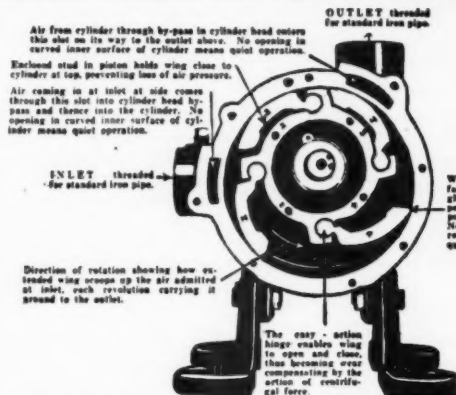
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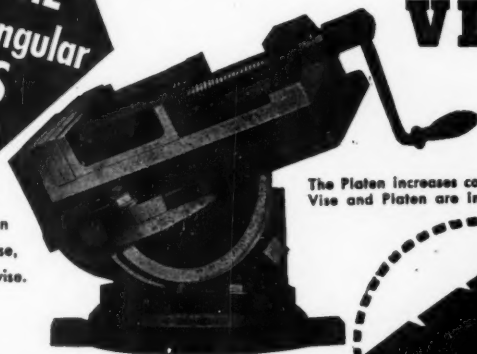
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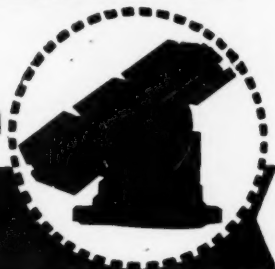
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The Platen increases capacity of the unit.  
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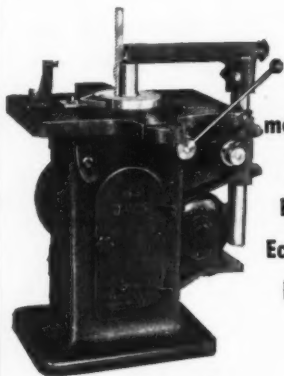
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enclosed fan cooled, foot mounted, ball bearing motors; one disconnect switch; one motor starter; one dust proof control cabinet mounted on rear of column; one push-button control station including motor control and traverse control.

For complete details and operational data, write the manufacturers:  
**National Automatic Tool Co.**  
Dept. BB  
Richmond, Indiana

### WELD CHIPPING TOOL HAS REPLACEABLE BITS

A new weld chipping hammer is announced that makes replacement of worn bits practical for the first time. "Re-Bit" has been adopted as the model name. Atlas Welding Accessories Company, the manufacturers, state that no balls, springs, screws, or clamps are used, and that a simple taper locks both bits securely in the head in any position desired.



Re-design of the blades has been incorporated to provide better visibility, longer life, easier access to tight spots and a wider chipping edge. Re-Bit Tomahawks are offered in 12 and 16 oz. weights with a choice of Flex-o-steel or wood handles. For details, write:

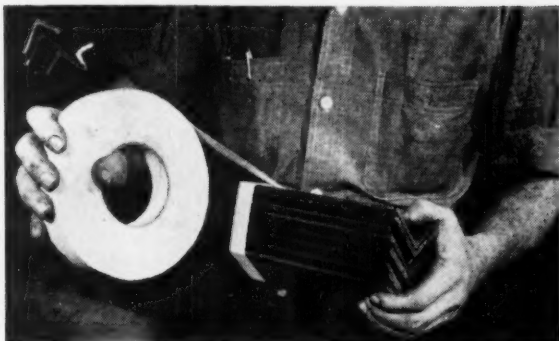
**Atlas Welding Accessories Co.**  
707 E. Lewiston Ave., Dept. BB  
Detroit 20, Mich.

The appointment of J. E. Haseltine and Co., 2nd Ave. and Ash St., Portland 4, Ore., with branches in Seattle and Spokane, as their distributor for the states of Oregon, Washington, Montana and Idaho, was recently announced by The Geometric Tool Co., Cutting Screw Thread Manufacturers, New Haven 15, Conn.

## PACKAGING TAPE WITH HIGH TENSILE STRENGTH

A paper tape strong enough to compete with metal strapping and rope for heavy duty packaging was announced January 1st by the Minnesota Mining and Manufacturing Co. It has a tensile strength of 180 pounds per inch of width. Designated No. 320 in the "Scotch" brand industrial tape line, it will be immediately available nationally.

Use of the tape saves workmen cuts and similar injuries, the producer declared. The tape is thin (13-15 mils) and flexible. It has a pressure-sensitive adhesive which grips immediately upon contact. The tape is designed for use in packaging metal pipes, conduits, sheets, coils, fittings and tubing, by wrapping it once around the load and back on itself, the producer said. It is also expected to be used in the ship-



ping of stoves, and metal cabinets, as well as window frames, doors, trim, raw lumber, wall board, panels, and plywood sheets. In addition, its use was foreseen for packaging plastic sheets, tubing and rods, and in the shipment of plate glass, chains, and miscellaneous assemblies.

The strength of the tape is attributed

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259

in part to reinforcing the paper backing with threadlike fibers running lengthwise. The fibers, imbedded permanently in the adhesive, also afford a tear resistance greater than can be measured by the ASTM-approved Elmendorf Tear Tester—greater than 1600 gram-centimeters.

Advantages cited for packaging with the tape, besides the elimination of packing machinery and greater safety for workmen, include speed in wrapping, and elimination of gouging or scratching the shipment by the wrapping material. For complete data, write:

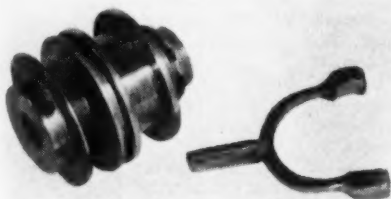
Minnesota Mining and Mfg. Co.  
900 Fauquier St., Dept. BB  
St. Paul 6, Minn.

#### NEW, SMALL V-BELT CLUTCH

The latest addition to the Ball-Lok line of V-Belt clutches, the Model AN, especially designed for fractional to 2 h.p. gasoline engines and electric motors, is announced by the V-Belt Clutch Co. The new model is of a reduced size, and features a pulley with a 2-5/16" o.d. for "A" belt drives.

Together with its companion models, the Model AN now makes available a complete line of V-belt clutches with a power range up to 15 h.p.

The new model is made entirely of steel. It has no frictional elements to wear or require adjustment and is built

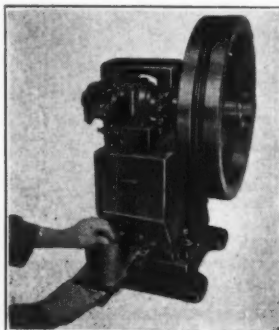


for long life. Because of its low starting load torque and equalized belt pressure, belt life is much longer than with ordinary clutches.

For complete information, write:  
V-Belt Clutch Co., Dept. BB  
3757 Wilshire Blvd.  
Los Angeles 6, Calif.

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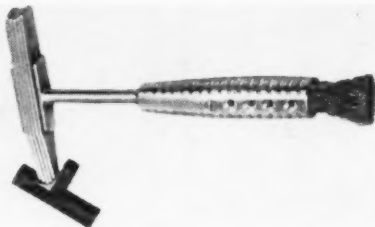
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## COMBINATION WELD HAMMER AND BRUSH

A wire brush for whisking away loosened slag rust from welded parts has been incorporated into the handle of the Bernard Multi-Pic Weld Cleaning Tool. The brush is exceptionally long, and is designed to reach into the deepest crevices; it is made from sturdy crimped, oil hardened wire. The handle contains a cavity into which the Repeater Brush is inserted. To adjust the brush as wear progresses, a flat head screw which holds the shank of the brush is removed, another usable portion of the brush drawn out to the next adjustment, and the screw again inserted. Five such adjustments are provided.



This new Repeater Brush makes the Multi-Pic Weld Hammer still more useful for all types of weld cleaning. It is a single hammer with five separate pick-pointed tool steel heads provided with free-floating action between guide plates welded to a steel shank. The handle is aluminum alloy. All five picks strike with equal force and adjust themselves to the varying contour of any convex weld head, any concave weld fillet, or any irregular surface. With five separate surface cleaning blows delivered with each swing of the hammer, welds are naturally cleaned more quickly and more easily than with single pointed hammers. The picks are made of tool steel, hardened and tempered; they can be resharpened on an ordinary grinding wheel. For further information, write:

**Bernard Welding Equipment Co.**  
741-743 E. 71st St., Dept. BB  
Chicago 19, Ill.

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**Sets  
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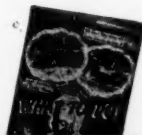
There's no need to tie up plant traffic while broken concrete floors are being repaired. Durable INSTANT-USE will restore your floors to solid smoothness in a hurry. This new plastic resurfacer is ready for use almost as soon as it's put down. Bonds tight to old concrete, makes long-lasting heavy duty patch. Withstands extreme loads.

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Compact, powerful, and remarkably economical in operation. JOHNSON Hi-Speed No. 120 reaches 1500°F. in 5 minutes. Delivers 2300°F. in 30 minutes. Easily regulated. Holds temperature at desired level for accurate heat-treating any steels. Ideal for small metal parts. Gets the job done fast to save time and gas. Firebox 5x7 $\frac{3}{4}$ x13 $\frac{1}{2}$ . Complete with Carbofrax Hearth, G.E. Motor and Johnson Blower. Order Today!

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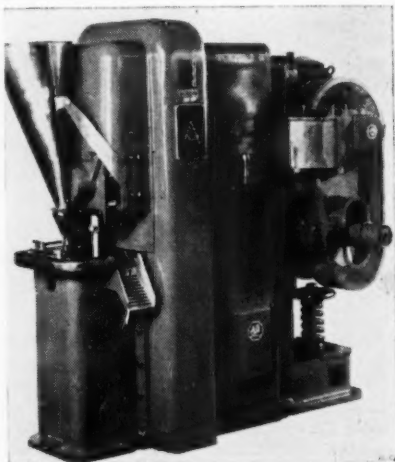
**JOHNSON GAS APPLIANCE CO.**

**370 E AVE. N.W., CEDAR RAPIDS, IOWA**

# **55-TON PLASTIC PREFORMING AND MOLDING PRESS**

A new 55-ton Preforming Press for preforming and molding plastics, powdered metals, carbon and copper generator brushes, and ceramic products, is introduced by the Arthur Colton Company.

This new Series 55 press is capable of producing 50 preforms a minute, and is designed primarily for making round and odd shapes, plain or with cored holes, having up to 3" cell depth and 3 $\frac{1}{2}$ " diameter. It provides for dies up to 6" in diameter and 3 $\frac{1}{4}$ " in thickness. Of welded steel construction, the new unit has all moving parts enclosed.



The press is powered by a 7 $\frac{1}{2}$  h.p. motor through a variable speed drive, so that speeds can be high for small work or slow for work requiring greater die fill time. A lever located near the work table operates a multiple-disc clutch and also a brake which can stop the press at any part of the stroke. Power is transmitted to the crank shaft through a cone worm drive which delivers high loads yet requires a minimum of space.

Adjustments can be quickly made for pressure, hardness, weight, thickness, and to compensate for core rod length

# MICO

## 2 and 3-Dimensional ENGRAVER

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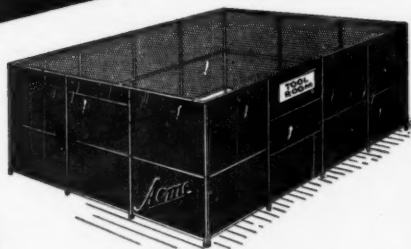
Improved pantograph design simplifies conventional engraving of templates, nameplates, panels, trademarks and machined parts.

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IMMEDIATE DELIVERY

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variations. An overload release prevents damage to the press when maximum pressure is exceeded. For complete specifications, including special attachments, write the manufacturer:

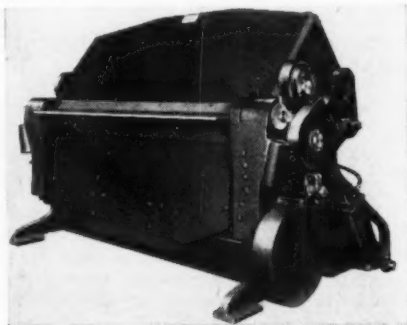
**Arthur Colton Co., Dept. BB**  
2600 E. Jefferson Ave.  
Detroit 7, Mich.

#### **LEAF-TYPE BRAKES NOW HAVE AIR-CLAMPING CONTROL**

Dreis & Krump Manufacturing Co., manufacturers of sheet metal working machinery, bending and press brakes, have recently designed and built their latest development in Power Leaf-Type Brakes. This machine is now equipped with an air clamping arrangement, which replaces the original geared-type clamp.

With the air clamp, the operator is able to control both ends of the machine simultaneously, or the operator and one helper can clamp each end independently. The manufacturer states that clamping is done with greater accuracy and speed, and with a minimum

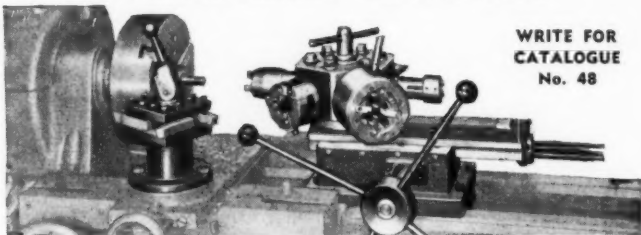
of effort. This type of clamp allows a broader variety of work to be done on the machine with greater speed and ease, it is claimed.



For complete design specifications on this new unit, write:

**Dreis & Krump Mfg. Co., Dept. BB**  
7400 Loomis Blvd.  
Chicago 36, Ill.

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CHICAGO 39, ILLINOIS

### PORTABLE PALLET RACKS

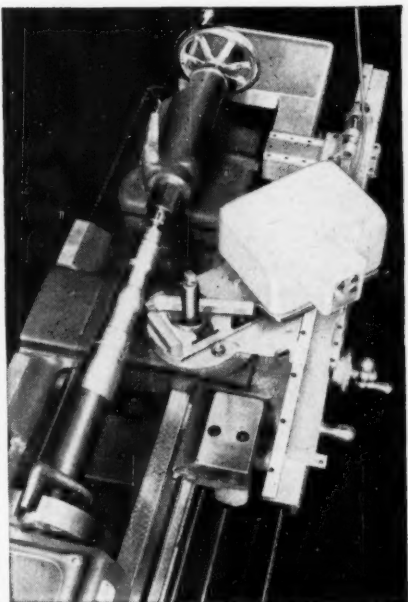
A new type portable rack for stacking palletized materials is offered in standard and heavy duty models by Equipment Manufacturing Co., Inc. R. K. Degener, sales manager, points out that the rack is designed to accelerate order-picking and case handling by permitting the tiering of pallet loads to ceiling heights without tying up low-level goods. Order-picking lines are thereby shortened, and a greater variety of stock can be stored in any one bay.

The racks can be quickly installed by merely spotting them in place with fork trucks; no welding or cutting is necessary. For varying pallet load heights, users enjoy the advantage of adjustable rack underclearance. Rack levels can be raised to accommodate high loads by the use of removable extension posts.



Some of the industrial trades finding use for the new pallet rack include: machinery, paper and textile manufacturers, metal fabricating, etc. Literature is available and field engineering is also offered. Write:

**Equipment Mfg. Co., Dept. BB**  
21599 Hoover Road  
Detroit 5, Mich.



### Lathe Duplicating Attachment Saves up to 50% on Shaft Work

The new LeBlond electric duplicating attachment reduces shaft duplicating and profile facing time up to 50%, and more in some cases. One customer reports that dies which formerly required 5 days to produce are turned with the electric duplicator in 1½ hours.

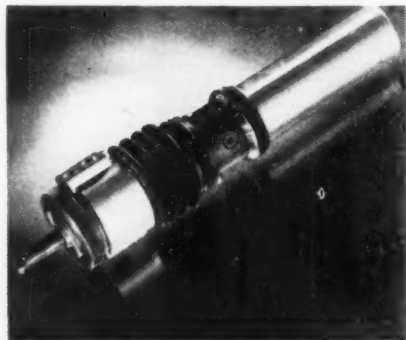
Intended for any Regal or Dual Drive Lathe—either new or for those already in the field—the duplicator can be installed in 10 minutes without drilling or fitting. Plugs into the nearest light socket for 110/115 volt, single phase, 50 or 60 cycle current.

It brings automatic sizing to Regals and Dual Drives, and will perform every duplicating function with accuracy of  $\pm .003$ ".

For complete information send today for bulletin EC-2. Address The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio. Largest Manufacturer of a Complete Line of Lathes.

### MAXWELL SMALL SIZE RECESSING TOOLS

The Maxwell Co. has announced the development and production of two new, small size, series "R" recessing



tools. Their small dimensions permit use in applications where larger recessing tools cannot be used.

These recessing tools incorporate the same features as standard tools in the

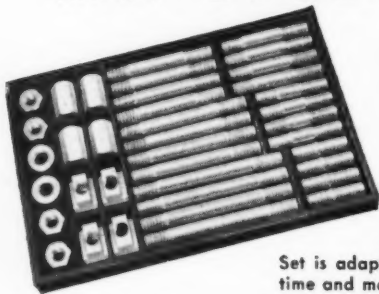
line. They have a micrometer-adjusting collar which facilitates rapid, accurate recess diameter control to within 0.001" or 0.050" per tool revolution. The tool holding section has serrated clamp blocks which match identical serrations on the cutter shanks to provide positive interlock and to prevent turning of the cutter in the workpiece.

All series "R" recessing tools now feature precision hard-chromed wearing surfaces to assure maximum tool life. The section into which interchangeable shanks are fitted has been improved to provide greater strength. A rubber guard is furnished with each tool to prevent entry of chips and other foreign matter into the working mechanism.

Models No. 1 and No. 2 tools have an overall length of 2-13/16" and 4" as compared to standard tool sizes which are 4-9/16" and 5 1/8" respectively. These new tools are available for cutting recesses from 3/8" to 1" and from 1" to 2". Cuts can be taken at a high

## Save Set-up Time! Cut Your Costs!

with the **HANDY STUD & NUT SET**



Each set has 40 pieces—precision made from quality steel, case hardened for long life, hard chrome plated. Hundreds of plants use them—to profit and advantage. Investigate! Write Today!

Here are the highest quality "T" Slot Nuts, Studs, Washers and Coupling Nuts you can buy—conveniently boxed—and at lowest cost! All sizes for all machines. They save machine and man hours—pay for themselves many times over.

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Set is adaptable, versatile. Assures rigid clamping. Save time and money with these handy, low-cost Stud and Nut Sets. Immediate delivery!

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## NOBLE & STANTON, INC.

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rate of feed. Tools are furnished having cutter ratio of either 1:3 or 1:1. Cutting action is smooth and requires only finger-tip feeding pressure. Cut location can be made from either top or bottom surfaces.

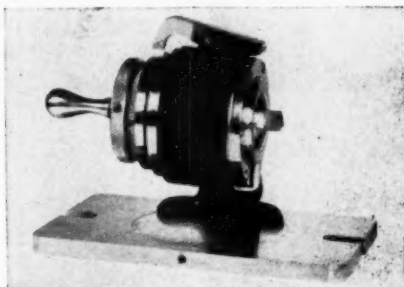
For more information, write:  
**The Maxwell Co., Dept. BB**  
**220 Broadway**  
**Bedford, Ohio**

#### NEW CHIP BREAKER GRINDING FIXTURE

A new compact, precision fixture which provides for flat or concave grinding of chip breakers on tungsten carbide insert type bits has recently been introduced by Royal Oak Tool and Machine Co. The device is provided with a pre-loaded ball bearing spindle, ground in the fixture to assure perfect concentricity.

The new fixture is designed for use with surface grinders, but can also be used with cutter grinders. The clearance from base to face of the collet is 5½" permitting vertical positioning

under the wheel. Calibrated scales provide for setting at desired angles, and interchangeable index plates assure true triangular and square forms.



Special collets for square, round, triangular and rectangular carbide inserts are available in ¼", ⅜", and ½" sizes.

For complete data, write:

**Royal Oak Tool & Machine Co.**  
**621 E. 4th St., Dept. BB**  
**Royal Oak, Mich.**

"The STANDARD of COMPARISON for QUALITY and ACCURACY"



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Precision made from finest oil hardened tool steel — ASA Standard — featuring concentric ground lead to insure perfect alignment. Complete stocks maintained at all times by exclusive distributors throughout the U. S. and Canada, for immediate free delivery.

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**CO., INC.**

1110 So. Santa Fe Avenue, Los Angeles 21, Calif.  
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TAPS  
TROUBLE**  
*with the New  
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**VIKING TAPPER**



You save time because the Viking Tapper eliminates the wasting of valuable time by highly paid skilled men trying to tap holes accurately by hand. One fifth the time is required.

You save taps because tap breakage is practically done away with. This enables the use of high speed ground thread taps at lower cost than carbon taps. The savings on taps alone will pay for the tapper in a short time.

You save trouble because Viking Tappers take the trouble out of tapping.

Stand or bench model. Adapters available in eight sizes.

For Precision Tool Room Tapping use the Viking Tapper. Capacity  $\frac{1}{4}$ " to  $\frac{3}{4}$ ".

WRITE FOR FULL INFORMATION

**THE VIKING TOOL &  
MACHINE CORP.**

**4 MAIN STREET, BELLEVILLE, N. J.**

**NEW MACHINE FOR REMOVING  
BROKEN TOOLS**

A light-weight portable disintegrator which can be kept on a tool-crib shelf, carried to the job in one hand, and set into the chuck of a drill press, is presented by the Elox Corporation. It is designated as the Model "X" Broken Tool, Stud, and Pin Remover.

Controls, and other equipment necessary for a permanent setup, are eliminated, which places the model X in the portable tool class. The Model "X" is primarily a broken tool remover, designed to cover the needs of any shop where taps, drills, reamers, studs and pins occasionally require removing, in sizes from .085" upward.



The user has only to supply a source of water and electricity at lighting voltage. The machine uses only about two gallons of water per hour and approximately three cents worth of electricity. The time taken to remove a broken tool depends upon many variables, such as size, depth, through or blind hole, kind of metal etc., but the self-feeding feature gives a fast, clean cut regardless of the nature of the job. On large production jobs, where breakage is frequent, one operator can operate several units without difficulty.

The Model "X" does not anneal the work; there is no distortion, electrolysis or mutilation, and the hole-wall

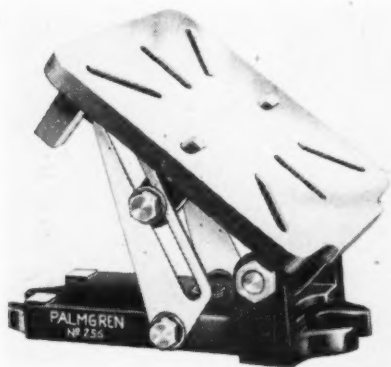
or thread is not touched or damaged in any way. For complete details, write to the manufacturer:

**The Elox Corporation, Dept. BB  
Clawson, Michigan**

#### **ADJUSTABLE ANGLE PLATES FACILITATE JOB SET-UPS**

For quick set-ups of all jobs that are difficult to hold in a vise, the new Palmgren Adjustable Angle Plates can be used for drilling, milling, layout, inspection, and other jobs ordinarily requiring special set-ups. The Angle Plates are very useful in machine, pattern, and woodworking shops.

The bases are provided with bolt lugs for fixing the Angle Plate to the machine table. Eight bolt slots are provided on the surface plate for holding the work, permitting extreme adaptability in holding irregular pieces firmly in place. The plates can be adjusted to full 90°, and are graduated for all angles. They are ready for instant use by locking the adjustable support screws. They are furnished either with or without graduated swivel bases.

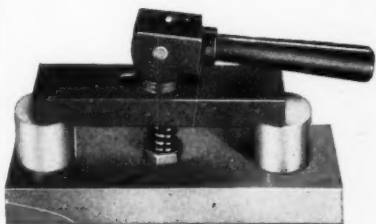


Two sizes are available: No. 256, with a 6" square plate, and No. 249, with a 9" x 9" plate. Full information can be had upon request to:

**Chicago Tool & Engineering Co.  
8383 South Chicago Ave., Dept. BB  
Chicago 17, Ill.**

## **Siewek**

## **Announces**



No. 10065

### **3 NEW Double Strap Fixture Clamps in 18 Sizes**



Model  
4900

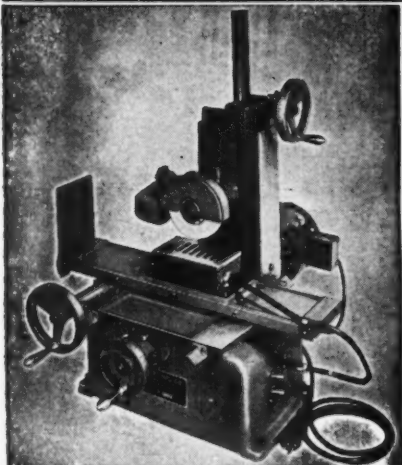
**Rack & Pinion  
Drill Jig  
Drill Jigs  
Available in  
161 Sizes  
13 Styles**

**SIEWEK is The ONLY  
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Complete Line of  
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A sensitive machine built to rigid standards of accuracy and workmanship specially designed "For the job that fits in your palm."

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**SANFORD MFG. CO.**

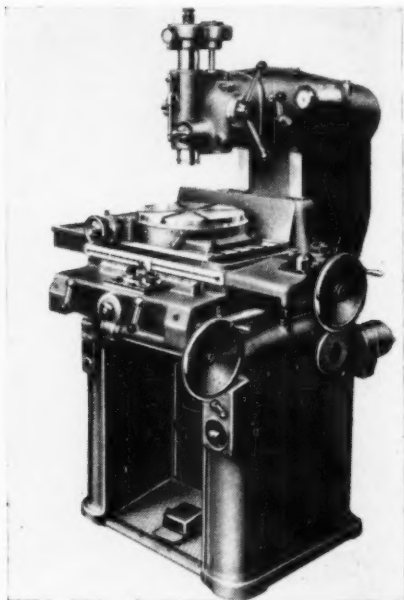
1020-28 Commerce Ave.

Union, N. J.

## HAUSER PRECISION JIG BORER

A Swiss precision jig boring machine combining high accuracy with exceptional output capacity has been made available by Hauser Machine Tool Corp., exclusive U. S. Factory Representative of Henri Hauser, Ltd., Bienne, Switzerland.

A feature of this machine (Hauser 2BA) is the centralized control. From the operating position in front of the machine all controls are within convenient reach. Micrometer screws are made of special steel, hardened, and high-precision ground. The microscope is manufactured according to the Hauser patented method of three-point suspension and is independent of the rotating part of the spindle.



The unit's capacity is 14" x 8", readings .0001" and accuracy of slide locations .00015". This borer can be used for production work when the cost of jigs is not warranted. All operations such as centering, marking out and checking can be carried out with ex-

trema accuracy. For complete specifications and operational data, write:

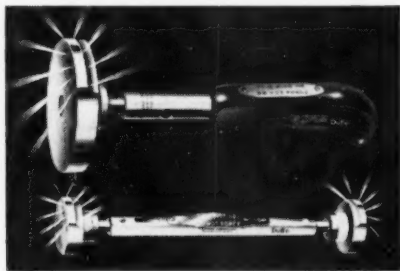
**Hauser Machine Tool Corp., Dept. BB**  
74 Bournedale Road, North  
Manhasset, N. Y.

#### **DU-BO PLUG GAGES NOW CHROME PLATED**

DuBo Plug Gages with hard chrome plating on the gaging surfaces are announced as available by Standard Gage Co., Inc. These plated gages are claimed to have exceptional life. As an indication of wearability, the manufacturer cites cases in which plain steel DuBo gages, the only kind previously available, have outlasted standard steel cylindrical plugs six to eight times, based on number of gaging operations performed before a given amount of wear. Now, chromium plated DuBo gages with their even greater life, are recommended for especially long runs and for checking the more abrasive materials.

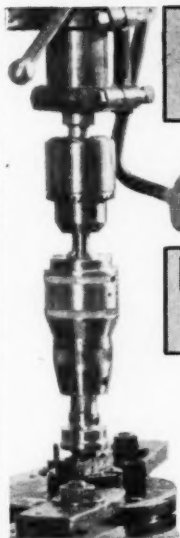
In contrast to cylindrical plug gages, DuBo's give their indication by other means than whether or not they can be entered into a bore. A DuBo member is entered with its spherical gaging surfaces out of range of the bore walls, and following entry, the gaging surfaces are rocked into contact, or potential contact, with the inside of the bore. Much of the frictional action common to cylindrical plugs is therefore avoided.

Chromium plated as well as plain



steel DuBo gages are available in all standard accuracy classifications including that as fine as XX. For further information, write to E. L. Sweet, c/o:

**Standard Gage Co., Dept. BB**  
Poughkeepsie, N. Y.



**Fingertip  
Precision**

**Production  
Speed**

#### *Lyon* **INTERNAL GROOVING TOOL**

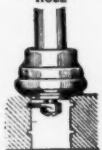
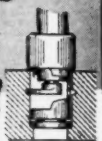
Saves costly preparation time — precision grooving of single or multiple grooves at a production rate — low initial cost, has been designed for making internal grooves to tolerances of .001" using any drill press, turret lathe, radial drill or automatic equipment.

**SEND FOR CATALOG**



**LYON MACHINE CO.,  
WORCESTER 3, MASS.**

Our Engineering Department will welcome the opportunity of discussing any grooving problem without obligation.



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Concentricity in  
Low 10,000ths

**NEW,  
AMAZING  
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TECHNIQUE**

**YOUNG PRECISION EXPANDING  
MANDRELS FOR PRODUCTION  
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Curtiss-Wright Corporation ranks our product with their best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial production boosts.

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**THRUST BEARINGS**



**REGULAR  
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DESIGN TO 24" O.D.**

We also make Thrust Bearings  
interchangeable with other manu-  
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**We take in extra work on  
Blanchard Grinders.**

**ACORN BEARING CO.**  
68 Stanley Street New Britain, Conn.

**"SILENT DEATH" CAN BE STOPPED**

By the use of a secret instrument developed and manufactured during the war by the National Bureau of Standards, many lives are being saved annually from carbon monoxide poisoning. The N. B. S. Carbon Monoxide Indicator is used "for the rapid determination of infinitesimal" amounts of carbon monoxide in the air. It is so sensitive that it can detect and estimate less than 1 part of carbon monoxide per 500 million parts of air. It takes about one part of carbon monoxide in 10,000 parts of air to affect the human system. The United States Safety Service Co., has been licensed by the government to manufacture the device under the trade name "Saf-Co-Meter" Carbon Monoxide Indicator.



The detector consists of a glass tube, about the size of a pencil, sealed at both ends, and a rubber bulb, packed into a small kit which fits into the pocket. When the presence of CO is suspected, the operator opens the kit, breaks the tips off the small tube, and inserts one end into the bulb. When the bulb is squeezed, a sample of air is drawn through the chemicals in the tube. If carbon monoxide is present, the yellow chemicals turn green in thirty seconds. The darker the shade of green, the higher the CO concentration.

The new instrument is being used in

The Right

**CUSHION MATERIAL**

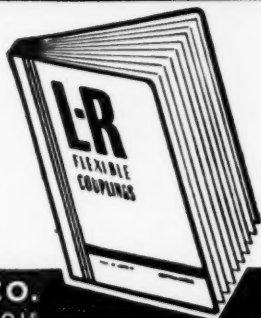
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**LOVEJOY L-R**

**FLEXIBLE COUPLINGS**



Only with flexible couplings fitted to the peculiar requirements of the particular job can you be sure of maximum efficiency. Write for this Catalog, and Selector Charts for all the data that will enable you to select the coupling suited to your application.



**LOVEJOY FLEXIBLE COUPLING CO.**

5024 WEST LAKE STREET • CHICAGO 44, ILLINOIS

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MACHINE**

FOR  
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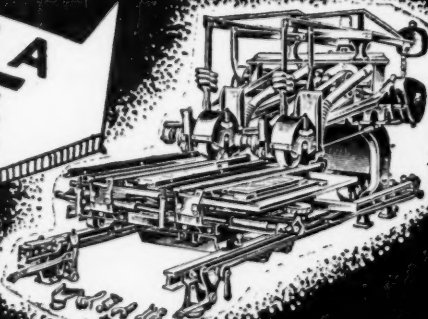
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**AUTOMATIC**  
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**TOOL & MACHINE CO., EAST ST. LOUIS, ILLINOIS**

cabins of gas propelled boats, in buses and motor transport cabs, in auto repair shops, refineries, mines, private automobiles, or wherever carbon monoxide fumes might be expected. For complete details, write:

**United States Safety Service Co.**  
1215 McGee St., Dept. BB  
Kansas City, Mo.

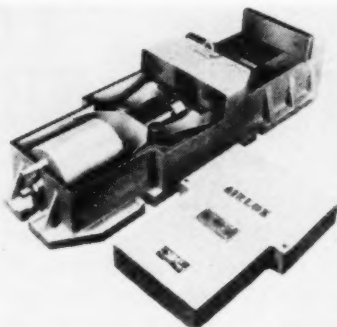
#### PNEUMATIC VISE EXERTS 10 TON GRIP

The Airlox Senior Model S-200 Pneumatic Vise, recently introduced by Production Devices Inc., was designed primarily to accomplish production work holding on milling machines of from 40 to 50 h.p. The new unit has the extremely high gripping power ratio of 200 to 1; with 100 pounds of air in the line, a grip of ten tons is exerted on the work. The vise is so designed that it will safely accommodate an air-line pressure of 200 pounds, if a jaw squeeze of that amount is desired.

The overall length of the vise is 45"; overall width, 13 $\frac{1}{8}$ "; overall height, 8 $\frac{3}{4}$ ". The unit weighs approximately

575 lbs. The jaw width of the vise is 10 $\frac{1}{2}$ "; jaw depth is 3". The jaw bolts are spaced 7 $\frac{1}{4}$ " on centers, 1 $\frac{1}{2}$ " from hole center to the vise bed.

The maximum movable jaw stroke is  $\frac{5}{8}$ ", and is adjustable to 1/16" minimum.



The maximum jaw opening is 12" between castings. For complete data on this useful pneumatic device, write:

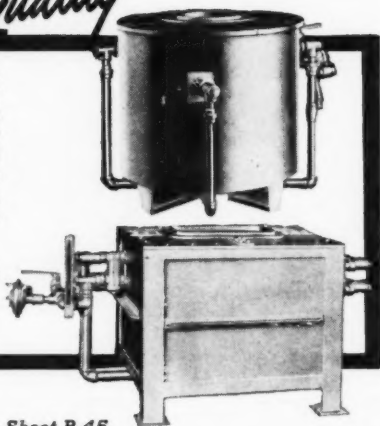
**Production Devices Inc., Dept. BB**  
Whitehall, New York

## POT FURNACES FOR HEAT TREATING

that have *Proved their Quality*

Surface Combustion has been building gas-fired pot furnaces of all types and sizes for many years. Thousands of these furnaces serve industry every day—have proved their high quality. 'Surface' Pot Furnaces are ideal for hardening, drawing (tempering), and interrupted quenching in liquid baths of lead, salt, cyanide, oil, or any other desirable heating medium.

A wide variety of standard sizes and temperature ranges are available in both rectangular and circular types. Special sizes can be built to order.



*'Surface'*

Write for Specification Sheet P-45  
for complete data.

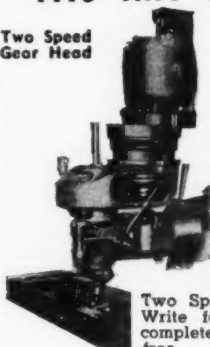
5064

**SURFACE COMBUSTION CORPORATION • TOLEDO, OHIO**

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Two Speed  
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## MILLING HEAD"



Now you can double the number of present speeds, prolong tool life, permit use of longer cutters, increase production and obtain other advantages by using the Olson Two Speed Gear Head. Write for bulletin with complete details. It's free.

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**DIAMONDS**  
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FOR ALL INDUSTRIAL PURPOSES

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KOEDEL DIAMOND TOOL CO.  
9456 Grinnell Avenue, Detroit 13

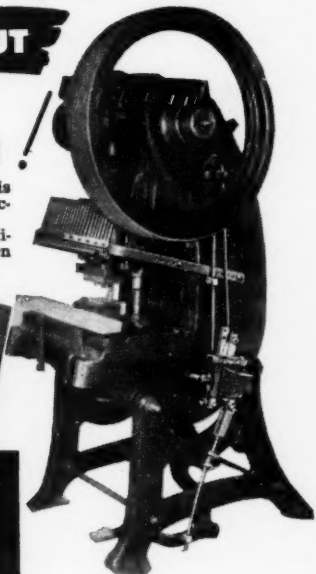
## PRODUCTION STANDS OUT WHEN PROTECTION IS BUILT IN!

With Junkin Safety Guards on the Job, EVERY MINUTE is devoted to production—because costly, time-consuming accidents are eliminated.

You reap the important benefit of improved worker efficiency too, for with this ever present evidence of protection press operators are able to hit new peaks of efficiency.

Send for bulletins describing the Junkin Safety Guard and Swinging Die Closure. Address:

**JUNKIN SAFETY  
APPLIANCE CO., INC.**  
936 W. Hill Street,  
Louisville, Ky.



**JUNKIN SAFETY  
GUARD**

### BRISTOL TIME-IN-PROCESS-RECORDER

The development of a new instrument for recording time-in-process is announced by The Bristol Company. The instrument gives a reading on a uniform scale and chart of the rate of conveyor movement, directly in terms of the total time consumed by work in traveling through a process.

In many industries, specifications for processing products are stated in terms of total time through the process. If a conventional tachometer is used, the operator must convert revolutions per minute or feet per minute into total time, which is difficult since the time required for work to pass through a process is a function, not only of rate of movement, but also length of the path through the process.

With the new instrument, the readings of time-in-process are given directly with no calculations required. This simplifies the problem of establishing the correct conveyor speed for the desired time in process for a given product and eliminates errors.

Bristol Time-In-Process Recorders are used on such equipment as continuous furnaces for metal annealing, temper-

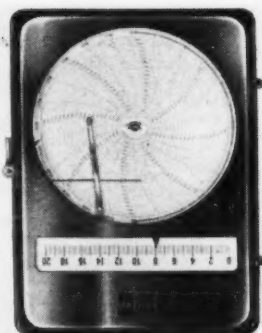
ing, and hardening, continuous drying and baking ovens, continuous ceramic kilns, etc.

For data, write:

**The Bristol Co.**

**Sales Promotion Dept. BB**

**Waterbury 91, Conn.**



### PIPE CUTTING OFF MACHINE

Known as the No. 662 "Cut Master" this portable machine is designed for cutting off small or large quantities of pipe within the range of  $\frac{1}{4}$ " to 2" inclusive. Examples of production ob-



tainable: 60 pieces of 2", or 150 pieces of  $\frac{1}{2}$ " pipe can be cut off in 10 minutes.

The motor is  $\frac{1}{2}$  h.p., 10,000 r.p.m., universal, variable speed, geared head

type, for light socket operation. The gear ratio is 29.25 to 1. Motor, idler shaft and cutter shaft are mounted as a unit on a plate hinged to the base casting. As the hand wheel is turned, the cutter wheel is moved up or down. The operator effort is minimized by a feed screw mechanism.

Rollers supporting the pipe to be cut off are mounted on needle bearings to minimize friction, permitting the pipe to turn freely. Rollers are grooved to prevent breakage of cutter wheel which is ground to reduce the burr on pipe to a minimum. For complete details, write:

**The Oster Mfg. Co., Dept. BB**

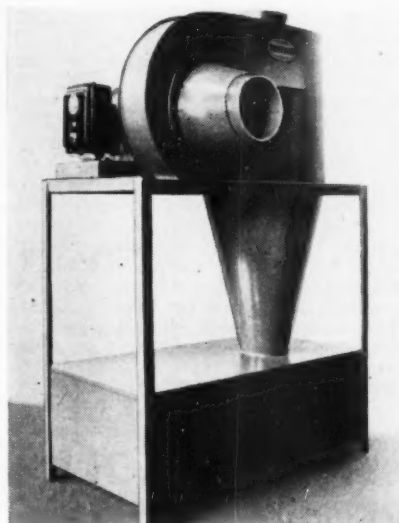
**2057 E. 61st St.**

**Cleveland 3, Ohio**

**Hydro-Line Air Cylinders.** Designed to assist designing engineers select correct size and type of hydraulic cylinders. Basic cylinder information, tabulations of dimensions. Hydro-Line cylinders are used for every job requiring pushing, pulling or lifting movement. Two bulletins, 14 pages each. **Hydro-Line Mfg. Co., 19th St., Dept. BB, Rockford, Illinois.**

## FILTERLESS DUST COLLECTOR ELIMINATES TOXIC FUMES

The new Model 20N30 Dustkop is a self-contained, portable 2300 c.f.m. dust collector designed for handling dusts and dirt or toxic fumes separately or in combination from various types of cutting, grinding and other machining.



In contrast with other Dustkop units in the line of Agat-Detroit Co., which feature recirculation of the cleaned air within the working space, the Model 20N30 employs a direct connection from the outlet of the cyclone separator to out-of-doors. The chief purpose of the new unit is to remove the dust and dirt from the air stream, yet permit the complete transfer of fumes from the working space to outdoors.

To facilitate installation, the units are available with a variety of standard sized inlets: optional sizes include single 7", single 6", double 5" or triple 4".

The unit itself consists of a self-clearing paddlewheel fan direct driven by a 3 h.p. motor, equipped with starter switch. Dust and dirt drawn in is removed from the air stream by the

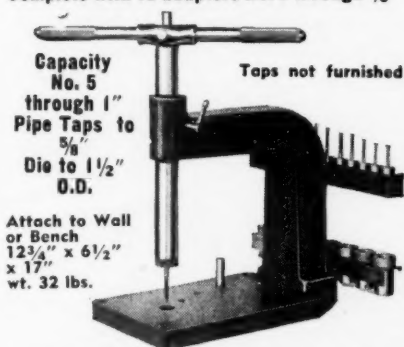
cyclone separator and deposited in the removable drawer in the dust bin. The cleaned air and any fumes not removed by the cyclone pass out through the outlet at the top of the cyclone where an 8" flange permits a slip fit connection with standard sheet metal pipe. Installation of the unit is usually made directly behind or near to the source of the dust, with the starter circuit of the dust collector being interconnected with that of the motor of the equipment creating the dust.

Ratings are based on instrument test, rather than on fan tables, according to the company, and are: volume; 2300 c.f.m. with 8600 f.p.m. velocity, and 4.5" static suction, all on 7" pipe. Floor size is 22" x 40"; overall height is 56". For complete information, write:

**Agat-Detroit Co., Dept. BB**  
Main at Washington St.  
Ann Arbor, Mich.

## Lassy Universal Tap and Die Guide Fixture **\$49.75**

Complete with 12 adapters No. 5 through 5/8"

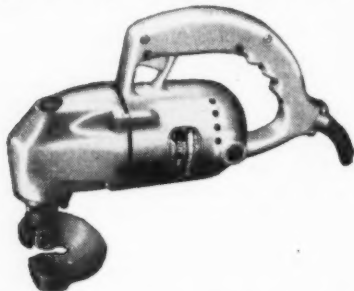


Guide can be removed from fixture for lathe and drill press work. Write for circular from your mill supply house or

**LASSY TOOL COMPANY**  
108 Bohemia Street Plainville, Conn.  
Also Complete Line of Hand Tappers

### 12-GAGE PORTO-SHEAR HAS WIDE CUTTING RANGE

The Black & Decker Manufacturing Co. has announced the addition of a new unit to their line of Porto-Shears. The new 12-gage Porto-Shear, greatly expands the range of shearing capacity in a variety of materials. It will cut 12-gage standard sheet steel while cutting approximately two gages thinner in



Monel metal and stainless steel and approximately 50% above the rating in sheet copper, aluminum, lead and other non-ferrous metals.

This portable shear will easily follow an irregular pattern because the cutting blade is always visible and will cut on a radius as small as  $1\frac{1}{2}$ ". A rapid reciprocating action of the vertical blade against the stationary horizontal blade makes a clean cut without burrs or ragged edges on either piece. The Black & Decker universal motor delivers 1100 strokes per minute at full load.

The 12-Gage Porto-Shear may be held in any position. The handle contains an instant-release trigger switch, with a locking pin for continuous use. The shear is ball-bearing equipped, except the eccentric, which operates in a phosphor bronze block.

Standard equipment includes one set of Porto-Shear blades; a set-screw wrench; 3-wire cable and plug; trigger switch with locking pin; and a Black & Decker universal motor which operates on either alternating or direct current.

For complete specifications, write:  
**The Black & Decker Mfg. Co.,**  
Dept. BB  
Towson 4, Maryland

## LOWN SLIP ROLL FORMING MACHINES

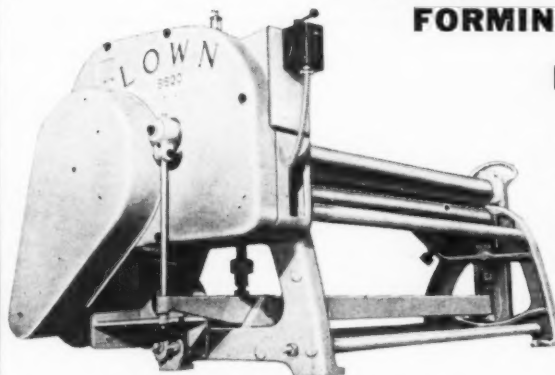
### B-600 SERIES

A new, improved, modern design, heavy duty machine, engineered for durability, strength and service.

SELECT THE BEST . . .  
LOWN Slip Roll Forming Machines are versatile . . . dependable . . . easy to operate.

Write for bulletins!

LOWN Slip Roll Forming Machines are built in a range of sizes from which you can choose the exact unit for your requirements.



Model B-600 Series—6" diameter

## SAN ANGELO FOUNDRY & MACHINE COMPANY

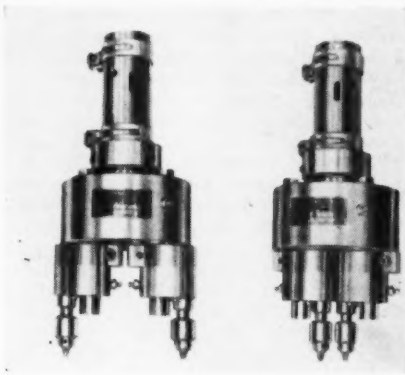
SAN ANGELO, TEXAS

1000 EAST UPTON

Distributors in Most Principal Cities

### ERRINGTON ADJUSTABLE DRILLING HEAD

Errington Mechanical Laboratory, Inc. announces their new Adjustable



Drilling Head. This new tool permits the user to take advantage of a wide range of adjustment, without overhang.

This can be seen in the contracted and extended settings pictured in the illustration. The Drilling Head can also be supplied with three spindles for equal adjustment in line, and three, four, five or six spindles for equal adjustment on bolt circles. The range is from 0 to 1½" drills.

The Errington Adjustable Drilling Head is fully geared. All spindles in head are provided with needle bearings. Ball thrust bearings throughout. The tool is furnished with a sand cast aluminum case. All parts are fully enclosed for pressure lubrication and protection. The Errington Adjustable Drilling Head has non-slip positive clamping on all adjusting members.

For complete literature on this new device, write:

Errington Mech'l. Laboratory, Inc.  
Huguenot Park, Dept. BB  
Staten Island 4, N. Y.

## RUGGED STABILITY

### ALLIED Heavy Duty Vise

Designed and constructed for handling tough production jobs.

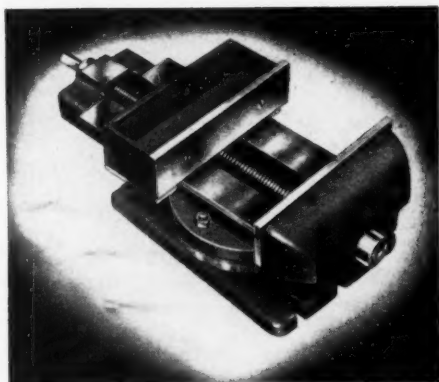
Screw extends thru both ends of vise and is fitted with a thrust bearing nut behind a stationary jaw. This unique arrangement provides greater clamping action on the work being held.

Base is accurately graduated in degrees.

Can be used on millers, shapers, grinders and drill presses.

#### SPECIFICATIONS

Opening of jaws	13"
Width of jaws	12½"
Depth of jaws	3¼"
Overall Length	24½"
3 slots in both end of base with	3¾" centers
Approx. weight	260 lbs.



**\$225.00**  
**PROMPT DELIVERY**

**ALLIED MACHINERY CO.**  
548 W. Monroe St., Chicago, Illinois

### WALTON HUMIDIFIER FOR MEDIUM SIZED AREAS

The Abbeon Supply Company, distributors for the Walton Laboratories, Inc., announces that the New "Junior Walton" size humidifier is now in production after a series of intensive field tests. This new unit, 10½" high and 13½" in diameter, is designed to fulfill



the need for a humidifier to take care of medium sized areas.

The Walton Junior Humidifier requires no steam, pumps, compressors,

nor return lines. It is noiseless in operation. The vapor is emitted looking like a fog, finer than cigarette smoke.

The operation of the humidifier is as follows: water is brought into the bottom pan of the unit and the water level controlled by float valve; a hollow copper tube rotating in the water forces a thin stream to ascend onto a disc revolving at 3450 r.p.m. This fine sheet of water is hurled onto a circular copper comb and instantly pulverized. Mounted on the bottom of this copper disc are small blades which create a turbulence in the air inside the unit. This air seeks escape through the port-holes in the dome, carrying with it the finest of the water vapor from inside the unit. The coarser vapor falls back down to the bottom of the pan and is reused.

The Junior Industrial Humidifier has a vaporizing capacity, slightly over one-half gallon per hour. For the water supply, a copper tube can be run in

### THE MOST COMPLETE LINE OF FILES



**Grobet** - THE OLDEST NAME IN FILES



When precision and accuracy are required GROBET only assures the finest workmanship performance and durability BACKED BY OVER 136 YEARS OF LEADERSHIP IN THE INDUSTRY.

Ask for GROBET by name at your nearest supply house—the most complete line of Swiss Precision Files, Riffles, Rotary Files, Burs, American Pattern Files, etc., etc.

**GROBET FILE CO. OF AMERICA, INC.**  
421 Canal Street New York 13, N. Y.

from any water line. An automatic control can be supplied that will automatically turn the unit off and on at any desired relative humidity. The unit can be hung from the ceiling or placed on a table or shelf. The motor is 1/40 h.p. drawing 75 watts. All parts of the unit are made of heavy gauge copper or other non-ferrous materials.

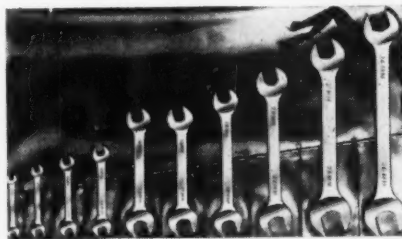
Information and literature can be obtained from:

**Abbeon Supply Co., Dept. BB**  
58-10 41st Drive  
Woodside, New York City

#### METRIC-SIZE OPEN END WRENCHES

Ten new Proto open end wrenches with metric-size openings for maintenance of foreign-made equipment, are announced by the Plomb Tool Co.

Opening size combinations, in millimeters, are 6 x 7, 8 x 9, 10 x 11, etc. up to 20 x 22, 21 x 23 and 24 x 26 mm. This range of sizes makes the wrenches suitable for Italian and French automobiles, as well as gear cutters and other types of European industrial equipment. The wrenches are forged, and have smooth shanks and polished heads. Two sets of these new Proto wrenches also have



been announced: No. 30000A (illustrated) contains all ten metric wrenches in a Velon kit; No. 30000R contains six wrenches, with openings sizes from 8 to 19 mm. in a Velon kit. "Proto" is a registered trade-mark and is the only brand name that may be used for identifying products of the Plomb Tool Co. For details on the metric open end wrenches, write:

**Plomb Tool Co., Dept. BB**  
Washington & Santa Fe Sts.  
Los Angeles 54, Calif.

#### LASSY UNIVERSAL TAP and DIE GUIDE

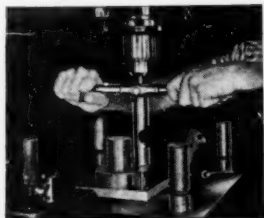


**\$18.75** f.o.b. Plainville  
6" GUIDE only



Complete with 12 Tap adapters No. 5 through 5/8" \$28.75. Die adapters 5/8" to 1/2" at \$2.75 ea.

Used on  
Lathe, Drill  
press and Jig  
Borer or as  
Extension  
Tap Wrench.



Write for circular from your mill supply house or:

**LASSY TOOL COMPANY**  
108 Bohemia Street Plainville, Conn.  
Also complete line of Hand Tappers

**Micro**  
*Supreme*

**LAY-OUT AND IDENTIFICATION DYE**

**13 COLORS**

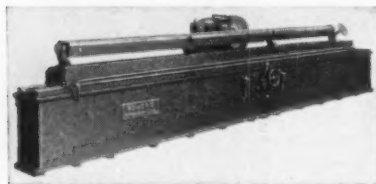
For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.

**MICHIGAN CHROME & CHEMICAL COMPANY**

6340 E. Jefferson Ave. • Detroit 7, Mich.

## ROGERS MACHINE GRINDS KNIVES UP TO 160" LONG

A new knife grinder with extra heavy duty construction throughout, for precision grinding of knives up to 160", is introduced by Samuel C. Rogers & Co. The new machine, type NT-160, is designed for accurate grinding of chipper knives, paper knives and doctor blades used in the paper industry and printing trades. It is also finding



acceptance for the grinding of paper and chipper knives used in the fibre box industry and for chipper and planer knives used in veneer and other wood-working plants. Its flexibility also adapts it for squaring shear blades

and other face grinding operations. The machine grinds flat or concave, wet or dry.

An outstanding feature is the wide 5" V-way on base and carriage, permitting heavier grinding pressure and fast feed required for production and precision grinding. The transmission is of the clutch-type design with reversing gears, employing a positive jaw-type clutch. Cross feed can be controlled either manually or by automatic control. A hand wheel with graduated indicator and dial permits quick set-up to exact grinding angle. A two-motor drive is utilized, one 10 h.p. motor to drive a 16" segmental grinding wheel, and a separate 3 or 5 h.p. motor for the carriage drive. The grinding head is mounted on the back base, and feeds automatically or by hand.

An exclusive feature is the automatic force feed oiling system for carriage bed and vertical drive shaft bearings.

## LUMA Soldering Tool



### RESISTANCE TYPE

A proven tool for all soldering jobs large or small. Heats instantly—low maintenance. Safe to operate. Write for details.

**LUMA ELECTRIC EQUIPMENT CO.**  
P. O. Box 132-H TOLEDO 1, OHIO

## OUR EFFICIENT TOOL DESIGNING

*means  
better production  
at a lower cost*

Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools — designed for economy of operation, resulting in your increased production at lower costs.

**COLUMBUS DIE TOOL**  
and Machine Co.

930 CLEVELAND AVE., COLUMBUS 1 OHIO

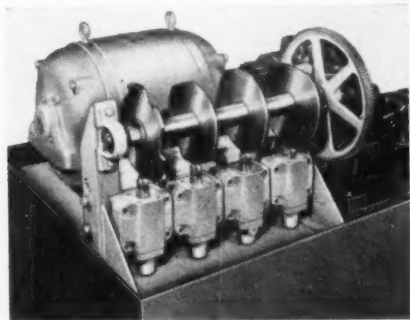
A built-in unit for wet grinding is standard equipment.

Illustrated Bulletin NT may be obtained by writing:

**Samuel C. Rogers & Co., Dept. BB**  
183-205 Dutton Ave.  
Buffalo 11, N. Y.

### HUFFORD MECHANICAL "BRAIN" TIMES HYDRAULIC INSTALLATIONS

Originally designed for use with Hufford Hydraulic Presses (see pages 244-46, January 1949 MACHINE and TOOL BLUE BOOK), this Mechanical "Brain" is adaptable to a variety of types of hydraulic equipment. It produces a series of exactly timed repetitive motions to multiple ram installations utilizing hydraulic cylinders. The device employs a series of specially designed cams which are machined for specific operations. The cams are mounted on a single shaft which is motor driven through a hydraulic transmission. Variation of speed is infinite over the desired range.

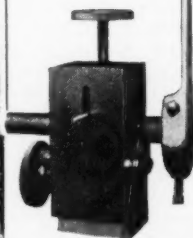


As the cams rotate, they depress the roller-bearing stems of actuating valves, thus permitting or cutting off the flow of hydraulic fluid operating the cylinders. Since there are no solenoids or intricate valve parts, maintenance is kept to a minimum. The sequence of operations cannot get out of time, however, the cams can be altered for different actions. Write:

**Hufford Machine Works, Inc.**  
Dept. BB  
Redondo Beach, Calif.

## HAND SPRING WINDER

**NO  
LATHE  
NECESSARY**



1. Ideal for tool room & maintenance shop
2. Easily operated by hand
3. No lathe necessary
4. Mandrel capacity to 1 1/4"
5. Wire capacity up to .229" diameter
6. Pitch capacity up to 1"
7. Clamps in your bench vise

**4 SIZES**  
Priced from  
**\$15 to \$35**  
**DELIVERY ONE WEEK**

Write for Complete Catalog

## MONTGOMERY

*Machine Tool Accessories*  
**53 PARK PLACE NEW YORK CITY**

## DORMAN AUTOMATIC REVERSE

**TAPPERS tap holes 2-56 to 2"**

**FRICION OR POSITIVE DRIVE**  
Single adjustment changes from positive drive to light friction drive . . . prevents tap breakage.

**No. 1 FRICION OR POSITIVE DRIVE TAPPER** drives 2-56 to 5/8" tap in steel or 1/2" in aluminum.

**No. 2A POSITIVE TAPPER** drives 3/8" to 7/8" tap in steel.

**No. 3A POSITIVE DRIVE** drives 1/2" to 1 1/4" in steel, 3/4" to 3/4" pipe taps.

**No. 4A POSITIVE DRIVE** drives 1" to 2" incl. pipe taps in steel.

All units efficient as production threaders using  
**Round Split, Button, Acorn Dies**

**Delivery from Stock**

**Write for Bulletin**



## Dorman Machine Tool Works

**40 S. MAC QUESTEN PKWY.  
MOUNT VERNON, NEW YORK**

### SHEFFIELD SPLINE BURRING MACHINE

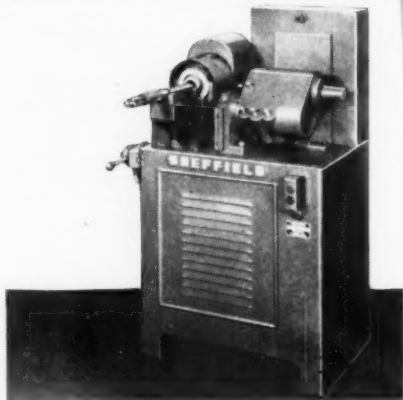
A spline burring machine is the newest addition to the line of machine tools manufactured by The Sheffield Corporation. It is said to be the only flytool machine that can burr a spline where the adjacent shaft diameter approaches the root diameter of the spline.

Problems of productivity, maintenance, cost, and floor space have been the chief factors in developing this machine. While primarily a single purpose device for the spline burring of either involute or straight splines, it can handle more than one size, provided the parts lend themselves to the general specifications of the machine.

In operation, the part is placed in a receiver, and the hand or air-operated clamping device forces the part into a rotating spline collar and forward against a positive stop. The part and cutter are timed together, and the flytool passing through the spline tooth, chamfers a 30° to 40° angle on each side of the tooth.

In many cases, splines may be

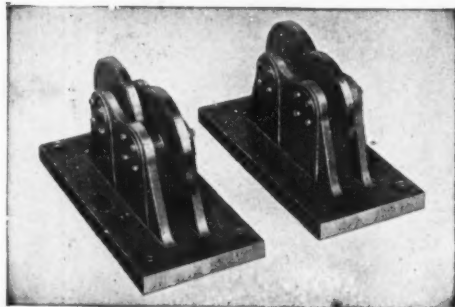
chamfered in the root as well as on the sides. The machine is in continuous motion at all times and after the part



has made a complete revolution, burring all splines, the operator is signaled

## PILLOW BLOCK BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work. Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.



**Built in 1000, 2000, 5000, 10,000  
and 20,000 Capacities**

Write for Bulletin 2-5



**ANDERSON BROS. MFG. CO., Rockford, Ill.**

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

# MULTIPLE DRILLING with a . . .



## MULTI-DRILL

**Increases Capacity  
Up to 800%**

**ADJUSTABLE TO ANY HOLE PATTERN  
FITS ANY DRILL PRESS**

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern — is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as  $\frac{1}{2}$ " — handle drill sizes up to  $\frac{3}{4}$ " in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

**COMMANDER MFG. CO.**

4227 West Kinzie St.

Chicago 24, Illinois

**Product of *Commander* — Builder of the *Commander Tapper***

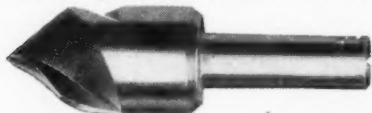
by a light. He then unclamps the part and it is ejected by a spring collar.

An average 10-tooth spline can be burred in approximately three seconds. Machine and loading time will average seven seconds, making the total floor to floor time ten seconds. For complete specifications on this new unit, write:

**The Sheffield Corp., Dept. BB  
Dayton 1, Ohio**

### SPIRAL FLUTE COUNTERSINKS REDUCE CHATTER

The Aero Tool Company has announced a line of high speed steel, spiral fluted countersinks designed to cut smoothly and reduce chatter. Three



spiral flutes increase the area of contact between the cutting edge and the work, and cut with a shearing action.

Cutters are available in  $\frac{3}{4}$ ",  $\frac{1}{2}$ " and  $\frac{5}{8}$ " diameters with  $\frac{1}{4}$ " shanks and  $\frac{3}{4}$ " and 1" diameters with  $\frac{1}{2}$ " shanks. Cutters are available for these included angles: 60°, 82°, 90°, 100°, and others. For details, write:

**The Aero Tool Co., Dept. BB  
6930 Avalon Blvd.  
Los Angeles 3, Calif.**

### NEW SHIM STOCK WALL RACK

A new convenience for shim stock users has been introduced by the Laminated Shim Co. A sturdy metal wall or bench rack (Rack No. 77) which holds any four gages of the company's 6" by 100" brass or steel stock rolls is now offered. The stock is packaged in thicknesses from .001" to .012" and the purchaser may choose the four gauges for which he has the greatest use. Previously, only standard assortments were available without this element of choice permitted to the user. For details, write:

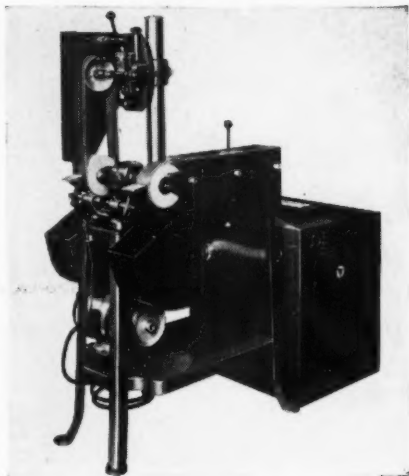
**Laminated Shim Co., Dept. BB  
Glenbrook, Conn.**

### DELTA MULTI-PURPOSE GRINDING, POLISHING AND DEBURRING MACHINE

A new H-type grinding, polishing and deburring machine, designed to accomplish many operations formerly associated with heavy-duty units, has been introduced by the Delta Manufacturing Division of the Rockwell Manufacturing Co. This new Delta-Milwaukee machine, using coated abrasive belts instead of grinding wheels, is a portable, compact unit that occupies a minimum of floor space.

A feature of this belt grinding, polishing and deburring machine is its adaptability for the use of two different quality belts at the same time. This factor speeds up small parts production which may require more than one finishing operation. In addition, the unit can be converted into a buffing machine.

All four basic models consist of the arbor head, an idler unit, a straight-faced contact roll and the abrasive belts. The arbor head is a strongly constructed grey iron casting. The precision ground  $\frac{5}{8}$ " arbor shaft runs in pre-loaded, lubricated-for-life ball bearings,





**MARRED HEADS**

# NONE of THIS!



**INSPECTION DEPT  
SCRAP!**

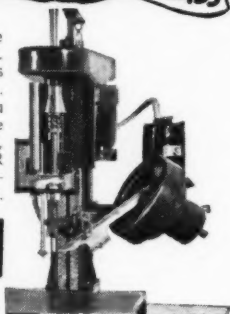
**STRIPPED THREADS**

**WASTE EATS INTO YOUR PROFITS . . .** and it's got a big appetite when you drive screws the old way, by hand. Stop the leak NOW. Use DETROIT POWER SCREWDRIVERS, the outstanding machines that do a perfect job without damage to heads or threads . . . and they drive screws at a tremendous speed, as fast as one a second. These hopper-fed machines will drive standard machine screws, sheet metal screws, self-tapping screws with standard, round, binder, fillister or hex heads and special heads. DETROIT POWER SCREWDRIVERS are furnished in 3 models, one to fit your requirements. Send sample assemblies for estimate and ASK FOR CATALOG.

## DETROIT POWER SCREWDRIVER CO.

2809 W. Fort St.,

Detroit 16, Mich.



firmly held in precision-bored bearing seats to assure vibrationless operation. Extending 3½" out from the inner flange at each end, the arbor shaft has a 2½" Acme thread at the ends to take contact rolls from ⅞" to 2⅞" wide. To eliminate vibration still further, arbor pulleys are dynamically balanced. Two drive belts can be run through the bottom of the arbor head for use on the welded steel stand, or through the back of the arbor head for use on other benches.

The general purpose contact roll has steel bushings for the ⅝" arbor. With an adjustable belt tension hand release, belt tracking adjustment and adjustable pulley position, running on lubricated-for-life ball bearings, the idler unit provides smooth running operation with idler drum 5-5/16" x 2½".

Aluminum oxide belts in four different grits are available for general purpose on steel, brass, forgings, die castings and some plastic materials. Silicon carbide belts are recommended for hard materials of low tensile strength, though Delta urges consultation with an abrasives expert for special cases. For complete information on the new Delta-Milwaukee unit, write:

**Delta Manufacturing Division**  
600 E. Vienna Ave., Dept. BB  
Milwaukee 1, Wis.

#### NEW WELDED EDGE HACKSAW BLADE

A new high-speed hacksaw blade that is shatter-proof and unbreakable has been introduced by the Millers Falls Co.

Named "Jet-Edge," the new blade is said to have already reduced cutting costs 20% to 50% for a number of selected industrial users under exceptionally tough testing conditions. Credit for their performance goes to the blade's extremely hard edge and its resistance to abrasion, which keeps the teeth in cutting condition longer.

"Jet-Edge," it is claimed, cuts faster, more accurately, and longer because it's tough, strong unbreakable back can be tensioned much higher, faster speeds used, and greater feed pressures applied, without blade deflection.

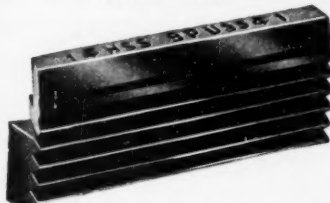
**Millers Falls Co., Dept. BB**  
Greenfield, Mass.

## DIE HEADS Chasers To Fit Any Type of Die Head Also Solid Taps

can be ordered on one purchase order. This eliminates any chance for error when special threads are required. We offer a Hygrade Product with prompt deliveries and a guaranteed saving.



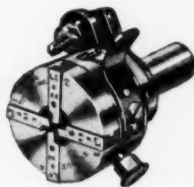
Any form of thread can be furnished on taps and chasers.



Tangent Chasers can be furnished in cut or ground threads.



Radial chasers can be furnished in milled, tapped or ground form. Circular chasers furnished in ground form only.



The most complete line of threading tools offered by any one company. Multiple thread milling cutters — shell or shank type.

Write for Catalog.

**The CHASO TOOL CO., Inc.**  
Royal Oak, Michigan

## SCHERR aids to precision — production

### SCHERR MICROMETERS have vernier reading to 1/10,000



at no extra cost, in 1", 2", and 3" sizes. This is right in step with modern demands for higher accuracy. Available in sizes up to 96". All Scherr micrometers have solid forged frames; easy reading graduations on thimble and vernier; longer life and more sensitive touch due to a burnishing process which compresses and polishes the surface of the thread; such refinements as ratchet stop to control the measuring pressure, and decimal equivalent markings on frame or barrel. Prices, 1", \$8.75, 2", \$9.50, 3", \$10.25. Write for bulletin and order the micrometers you need now.

### Measure depth easily with these DEPTH MICROMETERS

Made with 2½" and 4" base. Each instrument furnished with three interchangeable rods, to measure depth to 1", 2", or 3". With or without ratchet. A handy tool that can save its cost in a single precision job. Price, with ratchet, 2½", \$10.50, 4", \$11.75.



### An invaluable inspection tool



### THE SCHERR MAGNI-RAY

Magnifies the work under inspection, floodlights it as well, and gives the immense advantage of "two-eye seeing." No wonder thousands of Magni-Rays are serving in large inspection departments, and other thousands on precision machines or critical toolroom operations. The lens is ground by experts for true magnification. Heavy base permits swinging lens to any position, any height to 14 in. Three types—Model A, 3" lens, 1½x plus, \$21.65. Model B, 3x plus \$29. Model C, 5" lens, 1½x plus, \$34.

Write for full details on these tools, and for the Scherr Small Tool Catalog.

**GEO. SCHERR CO., Inc.**

198 - Lafayette St. New York 12, N. Y.

### NEW SERIES 200 12-INCH CLAUSING LATHE

The Clausen Manufacturing Co. has recently introduced the Series 200 to their line of precision lathes. The new series offers several features which are usually associated with higher priced units. Both the headstock and the gear box are enclosed and running in oil. The American Standards Association L-00 size spindle is forged, hardened and finally ground rotating on its own Timken tapered roller bearings. The enclosed motor drive is provided with infinite spindle speeds. The new series is equipped with spindle-to-back-gear engage-disengage, and double drive belts that are easily removed and replaced.

Additional convenience features include the quick change enclosed type gear box controls and the simplified single lever apron longitudinal and cross feed control. The rapid action feed reverse lever is conveniently located for the operator.

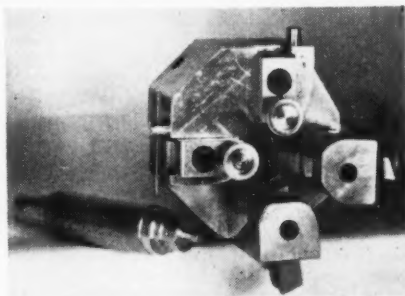


The new series 200 is provided with a 1" collet capacity, with a 1⅜" bore through the spindle, a 12¾" swing over the bed, and a 7⅝" swing over the carriage. The vee and flat ways are ground to within .001" parallelism. For complete detailed information, write:

**Clausen Manufacturing Co., Dept. BB**  
235 Richmond Ave.  
Ottumwa, Iowa

## INGENIOUS BOX TOOL SIMPLIFIES SET-UP OPERATIONS

The Multi-Micro Cut Box Tool (pat. applied for) is a special multi-tooled, short cut box tool designed and manufactured by the Multi-Micro Cut Tool Co., recently founded Minneapolis firm.



This ingenious device is so designed that a machinist can make up to six different shoulder cuts down to extremely short lengths. Stiff cuts may be made, since the unit is provided with

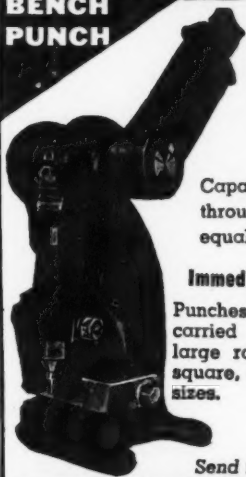
two rollers exerting equal pressure, assuring complete accuracy.

The new tool simplifies ordinary set-ups, permits complex set-ups, and eliminates the need for cross slide form tool set-ups for ordinary straight turning. The Multi-Micro Cut Box Tool has cut off stock up to 15/16" in dia., cutting four steps simultaneously, while maintaining concentricity on the one cut to .0002" accuracy. The two tool arms, shown in the illustration, are adjustable to center, and if simple work is being machined, one arm may be removed.

The tool has an adjustable range of from 1/4" to 1-1/16". It is manufactured to accept different sizes of tool shanks: For complete information, write:

**Multi-Micro Cut Tool Co., Dept. BB**  
3106 47th Ave., So.  
Minneapolis, Minn.

## FRONT LEVER BENCH PUNCH



**STURDY  
•  
DURABLE  
•  
HANDY**

Capacity: 1 1/8" hole  
through 1/4" steel or  
equal.

**Immediate shipment.**

Punches and dies are  
carried in stock in a  
large range of round,  
square, flat, and oval  
sizes.

Send for Circular.

**T. H. LEWTHWAITE MACHINE CO.**  
312 East 47th Street New York 17, N. Y.

# NOW



**LOW  
COST  
ALUMINUM  
SHELLS**

IN SIZES 1/4 TO 3/4 IN. DIA.

Produced by the New  
Economical Process

## IMPACT EXTRUSION

SEND SPECS. OR SAMPLES  
FOR QUOTATION

**PODLIN TOOL CO.**

Telephone: Gladstone 5-2028

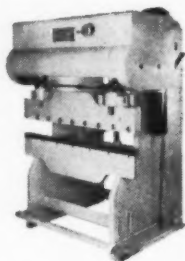
3922 Wesley Terr. Schiller Park, Ill.  
Tools • Dies • Model • Experimental

# Built like a rock but **EASY** on the budget

●KNIGHT Press Brakes' features include heavy welded construction, generous bearings, all controls located in front. Micrometer dial permits adjustments to .001". Visible extreme ram position indicators. Many features found only on expensive machines . . . built into these low-cost press brakes designed to relieve your larger, more expensive equipment.

## KNIGHT PRESS BRAKES

Available in four sizes: 24, 36, 48 and 60-inch capacities. Equipped with Link Belt anti-friction bearings, Cutler-Hammer controls, Reeves variable pitch pulley drives, Westinghouse motors, Twin Disc clutches. Designed also to facilitate quick and easy repairs and replacements.



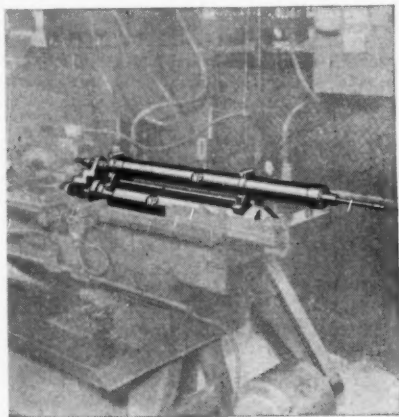
◀ **Write FOR**  
**DESCRIPTIVE CATALOG**  
**No. 9**



## POWER-CHECK PRECISION FEED CONTROLLER

National Pneumatic Company introduces its new Power-Check Precision Feed Controller. This device, when nose-mounted through a bracket attached to the moving element of any feeding mechanism, may be employed to retard speed automatically, and ease pressure at various points of feed travel.

If applied to pneumatic or manual drill press feed, the Power Check can be adjusted to retard the drill during the whole operation, or to ease the drill through at only the break-through point, where most drill breakage occurs. In milling and grinding operations, the Power-Check can be utilized to give a controlled uniform speed to eliminate the chatter and backlash that



cause tool breakage. The illustration shows a pneumatically fed deep-hole drilling machine equipped with a heavy duty Power Check.

The unit consists essentially of a hydraulic (oil) cylinder and an operating rod on which the fittings are quickly spaced and pre-adjusted, during the set-up of a machine, to provide a retarding pull up to 1000 pounds at the desired control points of feed travel. The Power Check is a self-contained unit with no external fluid connectors or reservoirs.

The operating rod can be attached directly to a drill press spindle bracket, or to the air cylinder piston rod of a pneumatic drill press; to a bracket on the fed table of a milling machine or a grinder, or air cylinder piston rod, if the table is air-operated.

Standard units are available with 2", 3", 4", or 6" stroke; other required lengths of stroke may be obtained on special order. In insuring automatic and accurate control of feed, the Power-Check compensates for inequalities in stock hardness at the work face or at any point of penetration. Tool breakage is reduced, and even inexperienced operators can turn out clean, high quality work. Detailed information may be secured by writing for Bulletin DC-208 to:

National Pneumatic Co.,  
Dept. BB  
Rahway, N. J.

#### BUXITE-TREATED GRINDING WHEELS REDUCE DIAMOND USE

A revolutionary method of coating each grain of a grinding wheel with a microscopically thin shell of carbon in an isotropic vitrescent form is being announced by the Mansco Grinding Wheel Company. This process, known as the Buxite process, makes wheels effective for grinding carbide tools and other super-hard alloys.

Fast cutting is accomplished with light passes that generate little heat, thereby preventing checking and cracking of the tool. The need for diamond wheel grinding is greatly reduced and frequently eliminated.

Life of Buxite treated wheels is said to be four to five times that of untreated wheels. They are also claimed to produce a cleaner grind and better finish. For complete information:

Mansco Grinding Wheel Co.,  
2164 E. 36th St., Dept. BB  
Cleveland 15, Ohio

**WESPO**

**PRECISION-MACHINED, HEAT-TREATED**

**T-BOLTS**

## Hold Work Firmly and Safely in Machine T-Slots



WESPO T-BOLTS are made to conform to standards set up by leading press manufacturers and users throughout the country. The bolt is made from a 3135, or equivalent, steel forging, heat-treated and drawn to a Rockwell of from 32 to 38 giving a tensile strength of approximately 170,000 lb. The back of the head is faced square with the body and the bolt is threaded to a class 3 fit. Nuts are threaded to a close fit and are hardened. Washers are hardened and ground on both sides. WESPO T-BOLTS are made in 1/2"-5/8" and 3/4" diameters, lengths to 12". Also 1" bolts in lengths 4 to 22". All parts are cadmium plated to prevent rust. Write for bulletin and prices.

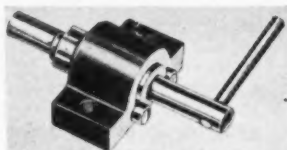
Representatives in industrial areas. Complete stocks at factory and at:-

ROCHESTER, N. Y.	Rekers & Roesell
WICHITA, KAN.	Cummings & Company
MILWAUKEE, WIS.	Triplex Supply Co.
CANTON, OHIO	Service Tool & Supply
CAMDEN, N. J.	Fidelity Tool Supply
CHICAGO, ILL.	J. R. Reinertson & Co.

**WEST POINT MFG. CO.**

19631 MERRIMAN COURT  
FARMINGTON, MICHIGAN

# **CUT TOOLING TIME PRODUCTION COSTS** with **SPED-LOK** PATENT—2,456,183

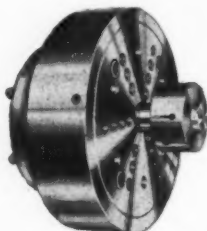


50% to 75% saving on jig and fixture tooling costs! Sped-Lok eliminates ALL hinge gates, screws, etc. for holding work. Operates easily and instantaneously. Automatic compensation.

This device can be placed any distance from work by using longer plunger bolt.

**CHARLES GREEN CO.**  
1324 W. Roscoe St., Chicago 13, Illinois  
Distributors wanted

## **STALLS 20 HORSE POWER MOTOR**



WITH SPEEDGRIP CHUCK GRIP-  
PING IN 1 1/2" DIA. BORE IN GEAR  
BLANK AND (5) TOOLS WORKING  
ALL AT ONE TIME.

**SPEEDGRIP CHUCK INC.**  
ELKHART, INDIANA

## **DUCON PORTABLE UNIT TYPE DUST COLLECTORS**

The Ducon Company, manufacturers of dust control systems and equipment, have recently introduced their Unit Type Dust Collector, available in four models. They provide an efficient and economical dust collecting unit, for use close to the source of dust. They are suited for collecting dust in grinding, polishing and buffing operations, at mixing or packaging machines, pulverizers, and similar uses.



The new unit is of the multiple-bag type, enclosed in a heavy sheet steel housing, with air-tight, riveted seams. The heavy cast exhaust fan has a paddle wheel type rotor. The filter bags are close-weave cotton fabric, with closed tops and open bottoms; the bags are suspended from a free-swinging shaker frame. The ample receptacle at the bottom of the filter is easily removable for dust disposal. Units are powered by standard a.c. single phase, 60 cycle, 3450 r.p.m. motors of 1/3, 1/2, 3/4, and 1 h.p., depending upon the size of the model.

Installation of the Ducon Unit is made by connecting a flexible tubing or duct, depending upon the size, from the point of the dust source to the col-

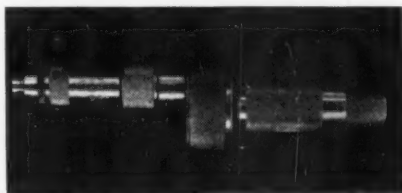
lector inlet, and making the electric wiring connection. The fan creates suction and draws the dust through the duct into the filter. The dust is collected in the filter bags from which it is shaken by manipulation of the shaker bar 3" where it passes into the dust receptacle.

Since these units are small and portable, their use eliminates the operation of large high-powered central dust collecting systems. For complete capacities and dimensions, write:

**The Ducon Company, Dept. BB**  
147 E. 2nd St.  
Mineola, N. Y.

### STEP-UP HANDPIECE TREBLES GRINDER SPEED

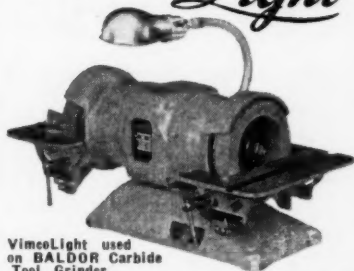
Applicable to all Wyco Grinders, both old or recent models, either multiple or single speed, Wyco's new No. 1300 Step-Up Handpiece multiplies the speed of any of these machines by three times or better. Using No. 1 to No. 5 shaft, and replacing the old standard handpiece, the new unit, by means of gear step-up, speeds the work to 5,000 r.p.m. or higher, with  $\frac{1}{4}$  inch mounted wheels—for carbide cutters, rotary files, mounted grinding wheels, abrasive rolls, and other applications.



On standard 3600 r.p.m. single speed grinders, the operator can now get over 10,000 r.p.m., so that small mounted grinding wheels can be used at a more satisfactory speed. Collets  $\frac{1}{4}$ " or  $\frac{1}{8}$ " fit this new handpiece. For carbide cutters, the No. 1300 Handpiece gives speeds up to 33,000 r.p.m. Further details may be had upon request to:

**Wyzenbeek & Staff, Inc., Dept. BB**  
838 W. Hubbard St.  
Chicago 22, Ill.

## YOU TOO Can Get Better Performance with VIMCO Light



VimcoLight used on BALDOR Carbide Tool Grinder.

Flexible arm directs hi-intensity light to important work areas . . . quickly . . . holds it steady. Styles and engineering service for any machine tool lighting application. Write for Folder 74.

**VIMCO MFG. COMPANY, Inc.**  
109 Brayton St. Buffalo 13, N. Y.

## STERLING DRILL GRINDER



### CAPACITY:

$\frac{3}{8}$ " to 2 $\frac{1}{2}$ " drills.  
5" x 9" adjustable table.

**MOTOR:**  $\frac{1}{2}$  hp,  
3450 rpm.

**NET WT:** 250 lbs.

**CRATED:** 320 lbs.

**McDONOUGH MANUFACTURING CO.**  
EAU CLAIRE, WISCONSIN, U. S. A.

# NUMBERALL

## LONG TAPER STAMPS



New Long Taper and Chamfered Corners for Locating Base of Letters and Aiding in Correct Spacing and Aligning • Steel Letters and Figures • Heavy Bevel • Heavy Stock • Tough Tool Steel • Deep Engraving •

Write for  
Bulletin BB 15

## PIK QUIK STAMP INDEX STAND

(Patent Pending)

Designed to speed up your Marking. Any character is quickly picked up and replaced in the Index Stand, keeping the stamps in perfect order. Our stamp prices up to  $\frac{1}{4}$ " include an Index Stand.

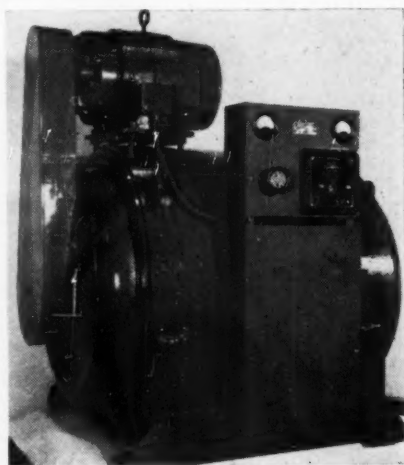


**NUMBERALL STAMP & TOOL CO.**  
HUGUENOT PARK STATEN ISLAND 12, N. Y.

## KATO INTRODUCES NEW SERIES OF ALTERNATORS

The Kato Engineering Co., recently added a new series of alternators to their line of electrical equipment. The new series permits a top capacity of 300 KW, at 1800 r.p.m., 60 cycles. They are available at speeds of 720, 900, 1200, and 1800 r.p.m. The units are provided with a direct-connected exciter on the high speed models, and top mounted exciters on the lower speeds.

The rotor is mounted on Sizes 3617 and 3620 Norma-Hoffman cartridge type bearings, sealed for life. A groove in the outer rise of the bearing permits adding grease through an external grease-gun fitting, if necessary. All rotors are constructed with dampner windings to facilitate parallel operation. They are banded with steel wire to protect the rotor field windings from centrifugal force damage due to moderate over-speed.



The stator is made of 26-gauge coated dynamo steel with  $\frac{3}{8}$ " ventilating air space for each 3" of lamination stack. The stator is held in an all-welded steel frame. The mounting feet are widely spaced to facilitate generator line-up for coupling or belt drive. Four lifting rings are provided, to permit hoist handling. A large junction cabinet is

built on the outlet side, providing sufficient room for making the conduit attachment. The voltage regulator control panel is mounted on top of the outlet cabinet, obviating the need for an external switchboard.

The illustration shows a Katolight 175 KW, 60 cycle, 3 phase, 900 r.p.m. eight pole, 480/830/960/1660 volt unit, with overhead belted exciter, complete with panel and accessories. For complete specifications and operating details on this new alternator series, write:

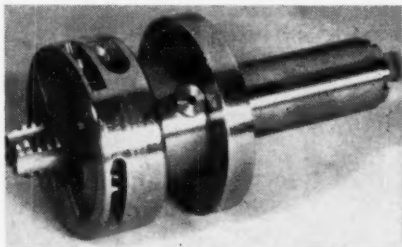
**Kato Engineering Co., Dept. BB  
Mankato, Minn.**

#### ADJUSTABLE DIE HEAD WITH COMPENSATING TAP HOLDER

The Eastern Machine Screw Corp. has developed a die head and tap arrangement, known as the H & G Solid Adjustable Die Head with a Compensating Tap Holder. This set-up will permit tapping an internal thread and at the same time cut an external thread as on a valve or a faucet or any other

piece that uses a tapped hole and has an external screw thread. The thread may be of different pitches and be cut simultaneously.

By using this die head and compensating holder, a tool space is saved on a machine as well as a cam layout, resulting in a substantial increase in production or a saving in time.



**Eastern Machine Screw Corp.  
10 Barclay St., Dept. BB  
New Haven 6, Conn.**

## How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through this center. The hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

**BUSHINGS MADE IN  
FOLLOWING SIZES:**

1/8, 1/4, 3/8, 7/16,  
1/2, 5/8, 3/4, 1"

Some Territories Still Open to Jobbers

**STURDY BROACHING SERVICE**

23516 TELEGRAPH RD., DETROIT 19, MICH.



Patents Pending

*Write for  
Literature*

# Use CRATEX RUBBERIZED ABRASIVE WHEELS

for "Blending In" and Polishing  
after Rough Grinding

Come ready to use

Reduce finishing time

Wear evenly down to the flange

Operate at normal speeds

(2000—5000 SFM)



For further information and  
free trial offer, write

**CRATEX MFG. CO.**

86 Natoma Street  
San Francisco 5, California

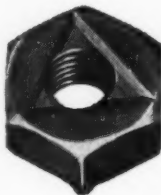
## LOCK NUT, WELD NUT COMBINATION

Where the application of nuts to bolts in productoin work is difficult, due to lack of space, or where metal sections are too thin to thread, it is becoming common practice to use projection Weld Nuts. The application process is then reversed; the nuts are welded in final position and the bolt is screwed into the nut.

A similar practice is followed in anchoring bulky products to shipping cases or frames. The weld nuts are welded to the product, and bolts passing through holes in the container are screwed into the weld nuts to hold the product in position during handling and transit.

Trouble has frequently been encountered in the nut-welding process by particles of welding metal dropping into the nut threads during the welding process, requiring retapping of the nut. This has been overcome in the Gripco 3-point projection Weld Nut, by counterboring the bottom of the nut

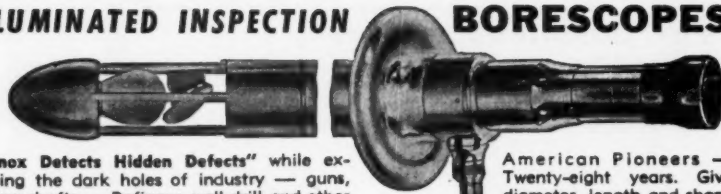
about a quarter of the way through, causing metal particles to fall on the counterbored portion (which slants outward) instead of on the threads. The thickness of the Gripco Weld Nut is increased to compensate for the threads removed by counterboring, thread depth being the same as in a standard



nut. The illustration shows (left) the Gripco "double triangle" thread-locking feature; (right) counterbore in Gripco Weld Nut. For details, write:

**Grip Nut Co., Dept. BB**  
310-Z S. Michigan Ave.  
Chicago 4, Ill.

## ILLUMINATED INSPECTION



"Lenox Detects Hidden Defects" while exploring the dark holes of industry — guns, hollow shafts — Refinery, well drill and other tubing, irregular dark spaces.

American Pioneers — Twenty-eight years. Give diameter, length and shape of cavity.

**LENOX INSTRUMENT COMPANY**

2008 CHANCELLOR ST.  
PHILADELPHIA 3, PA.

## Producers of SCREW MACHINE PRODUCTS to specifications.

We know our equipment.

Can we assist in designing your screw machine products for adaptation to our equipment?

Automatics—2½" Rd. capacity, Turret Lathes—3" Rd. capacity. Castings & Forgings machined to a maximum diameter of 10", length 8", weight 15 lbs.

We are also equipped for Milling, Drilling, Threading & Tapping. May we quote?

## SCREW MACHINE SPECIALTY CO.

5637-43 Butler St.

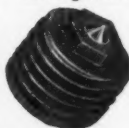
STERLING 2235

Pittsburgh 1, Pa.



## A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



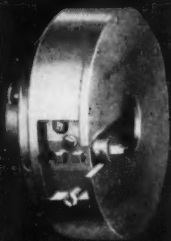
The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in  $\frac{1}{8}$ " to 1" diameters. Send for pricelist.

**HEIMANN MFG. CO.**

332 Lincoln Ave.

Urbana, Ohio

## IMPROVE FACING OPERATIONS



M-D Facing Head feeds automatically. Lathe tool bit travels radially, from center outward or reverse. 10 sizes 6" to 46" dia. Write for Bulletin, Prices.

On Boring  
Mills  
Drills  
Lathes  
Millers and  
Radials

**MUMMERT-DIXON COMPANY, HANOVER, PA.**

## For Sustained Accuracy TRY "MILWAUKEE"

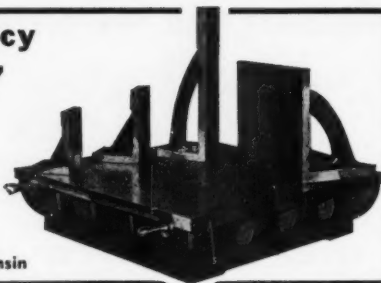
For the finest in checking and testing equipment, Milwaukee Surface Plates are hand scraped to within .00025". Angles and parallels are ground to exact dimensions.

Write for your free catalog today!

**J. C. BUSCH COMPANY**

ENGINEERS AND MACHINISTS SINCE 1907

165 S. Barclay Street, Milwaukee 4, Wisconsin



### RUNNING COUNT RECORDING INSTRUMENT

A new recording instrument, known as the Running-Count Recorder is announced by The Bristol Company. The new device plots on a circular chart a curve of number of operations against

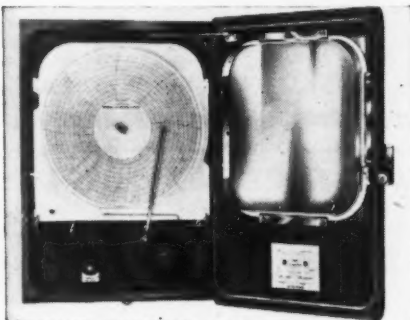
producing operations or number of pieces produced.

The total number of operations or pieces produced can be found by multiplying the number of complete pen transverse across the chart by the count per transverse for which the instrument is calibrated.

The hourly rate of production can also be easily read from the chart, giving information regarding the effect of fatigue on operators, variations in productivity between operations, effectiveness of job training programs, and the effect of variations in working conditions. Excessive down time is easily read on the chart.

The instrument is also used as a basis for paying production employees. It furnishes accurate record upon which to base payment. For specifications, write:

**The Bristol Co., Dept. BB**  
Waterbury 91, Conn.



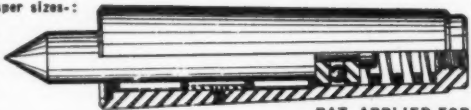
time. It records the total count of intermittent operations and the time at which each one occurs, and is used on production machinery to record work-

### NEW NEEDLE BEARING LIVE CENTER

Designed for heavy loads and precision work. Minimum overhang of center avoids vibration and chatter. Heavy, powerful spring compensates for any expansion of work due to heating during machining. Compact, neat, and rugged. Increases Production—Saves Time—Saves Money.

Furnished in Morse taper sizes:-

No. 1	M.T.—	\$15.25
No. 2	M.T.—	21.75
No. 3	M.T.—	26.75
No. 4	M.T.—	32.50
No. 5	M.T.—	39.75



PAT. APPLIED FOR

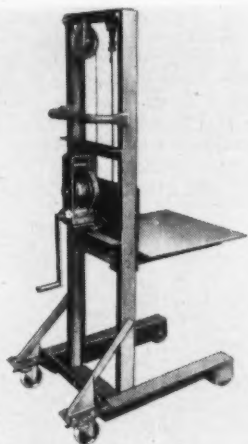
**L. F. TREICHLER-PRECISION GRINDING**

900 Route 29, North Plainfield, N. J.

Bullnose and female center inserts available in sizes listed.

### PORTABLE MANUAL ELEVATOR HAS 500-POUND CAPACITY

The new Barrett "500" Portable Elevator is adaptable to a wide variety of jobs where loads up to 500 pounds must be lifted from one to five feet. These applications include placing dies in presses or die racks, loading motor trucks, piling cases, barrels or bales, elevating materials into storage, raising loads to platforms, and for ceiling and lineshaft repairs.



This hand-operated elevator is designed for safe operation by one man. Capacity loads are easily raised or lowered, and can be stopped at any point on the way up or down. This sturdy elevator has an overall height of 6 feet, a lifting height of 5 feet, and a platform 24" square. The base of the load handled is limited to 30" x 42". The base wheels are 5" in diameter. The platform when lowered is only 5-3/4" from the floor. Other features include: all-welded construction, cut spur gear reduction, oilite bushing and a floor brake. For complete details, write:

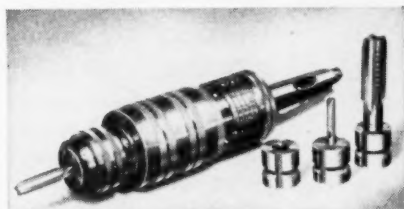
**Barrett-Cravens Co., Dept. BB**  
4609 S. Western Blvd.,  
Chicago 9, Ill.

### NEW TAPPING ATTACHMENT ELIMINATES TAP BREAKAGE

A new type of tapping attachment, designed specifically to eliminate costly tap breakage, is announced by the Wickman Manufacturing Co. This new device, known as the "Jay-Dee", guarantees tap safety, as well as offering operational simplicity and low maintenance.

The Jay-Dee does not employ coiled springs to provide driving pressures. Instead, a resilient material, claimed to be 150 times more effective than spring steel, delivers a safe cutting torque and protects taps regardless of load. Jay-Dee can be used with all types of reversible machines, for horizontal or vertical tapping, for blind or through holes. It is well suited for stud driving and for standard hand taps.

Four index stations, listed according to tap size on the body of the attachment, can be selected and provide a positive setting for a variety of materials. Tap changing takes five seconds; no wrenches are required. Tap adaptors are supplied for various size taps and these adaptors are inserted in the Jay-Dee's master collet and held in place by spring buttons. The only maintenance requirement is lubricant recharging at three-month intervals.



Jay-Dee is available in three models, all supplied with Morse Taper shanks: Model K-1, 16 1/2" long and 16 1/2 lbs., and with a 1/2"-1 3/4" USS range; Model K-2, 13 3/4" long and 11 lbs., covers 3/8"-1 1/4" USS; Model K-3, 10" long and 3 1/2 lbs., covers 3/16"-1/2" USS. For details, write:

**Wickman Manufacturing Co., Dept. BB**  
15533 Woodrow Wilson Ave.  
Detroit 3, Mich.

## UNIVERSAL CHECKING FIXTURE DEVELOPED BY MICHIGAN TOOL CO.

A Universal "Sine-Line" checking fixture, Model 471-A, for accurately checking gears, gear blanks, hobs, worms, worm blanks, milling cutters and form tools up to 10" outside diameter and 8" maximum face width, has been introduced by Michigan Tool Company. With the various indicator assemblies available with the machine, this single fixture can be used to check tooth spacing, pitch radius, concentricity and taper of spur and helical gears, plus parallelism and crowning of spur gears.

The Universal fixture may also be used to check flute spacing, radial or off center sharpening, depth of form, parallelism of straight flute, o.d. eccentricity, and the amount of form relief on form and milling cutters; plus flute spacing, radial or off center sharpening, parallelism of straight flute, lengthwise taper, concentricity of proof diameters, multiple thread spacing or

axial lead, and pressure angle of hobs; also tooth depth and concentricity of topping hobs.

With the two standard indicator assemblies furnished with the Model 471-A, tooth spacing, pitch radius, concentricity, and taper of spur and helical gears may be checked; the assemblies will also check the outside radius and concentricity of gear and worm blanks.

An additional indicator assembly will check parallelism and curve-shave (crowning) contour of spur gears. Two special indicator assemblies are available to check thread spacing and pressure angle of worms.

A special feature of the machine is the use of Carboly cemented carbide tipped cones in a suitable range of sizes for the cone check of pitch radius, concentricity and taper of spur and helical



### FERRACUTE "P" PRESS

**Work Horse  
of the Industry**

### FERRACUTE PUNCHING PRESSES

keep busy . . . profitably . . . in every plant. For forming work and punching or shearing of heavy stock. Sturdy, rugged, amazing low maintenance and operating costs. From 20 to 150 tons, geared or flywheel.

Write for full specifications.



**MACHINE CO.**  
BRIDGETON, N. J., U.S.A.



gears. The long wearing characteristics of the tungsten carbide assure maximum accuracy for life even when the checker is used for production checking.

Indicators on the two standard and

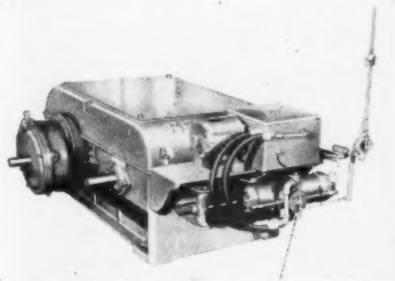
two special indicator assemblies have 0.0005" graduations, while the other special indicator assembly used in checking thread spacing of worms, has an indicator with graduations in 0.002".

The headstock and tailstock ways are cast integrally with the base of the fixture, and are scraped to surface plate precision. The longitudinal ways on the indicator base, in which ball bearings operate, have hardened steel inserts and are finished within 0.0002" on the parallel. Headstock and tailstock may be clamped at any point on their scraped ways, and the tailstock center is retractable. The Model 471-A occupies a floor space 17½"x33¼"; its height is 43⅞".

Michigan Tool Co., Dept. BB  
7171 E. McNichols Road  
Detroit 12, Mich.

#### HYDRAULIC CONTROL VALVE FOR VARIABLE SPEED TRANSMISSION

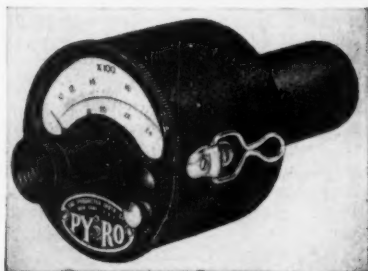
A new, rotary type valve to provide maximum efficiency on hydraulic controls for Reeves Variable Speed Transmission is now available from the Reeves Pulley Co. The device is a feature of the Reeves hydraulic control which, applied to the Transmission, permits automatic speed regulation for synchronization of different machines and separate sections of a single machine; maintenance of control tension



and uniform peripheral winding speeds; and maintenance of uniform pressure, weight, liquid level, temperature and other variable elements.

Simple in design and with few moving parts to wear, the valve is actuated

**Here's all you need to tell spot temperature instantly!**



**Just sight it... and press the button!**

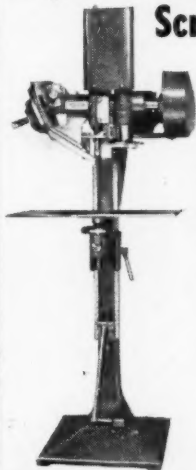
#### PYRO Radiation Pyrometer

Determines spot temperatures of heat-treating furnaces, fire boxes, kilns and forgings accurately—**instantly**. No thermocouples, lead wires or accessories needed. Temperature is recorded on direct-reading dial at press of button. Any operator can use it. Two double ranges for all plant and lab. needs.

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**The PYROMETER INSTRUMENT CO.**  
New Plant and Lab., Bergenfield 3, N. J.

### Reynolds- Magazine Feed Screw Driving Machines



**Simplify and  
Speed up those  
high production  
Assembly jobs.**

**A complete line of  
production type  
screw driving  
machines for every  
application.**

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**COOK & CHICK CO.**  
640 S. MILLER ST. CHICAGO 7, ILL.

with only four ounces pressure. Its stem is mounted on ball bearings to assure smooth operation, with minimum friction. Because of its rotary design, eliminating lateral motion of the stem, the new Reeves valve can use to full advantage a tight-fitting, cup-type oil seal which prevents oil leakage around the valve stem.

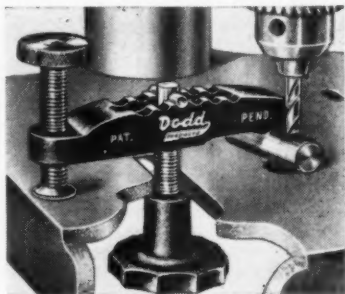
The valve is being installed on all new Reeves Variable Speed Transmissions, replacing the stem-type valve previously used. It also is available for replacement on Transmissions now in service. For complete information, write:

**Reeves Pulley Co., Dept. BB**  
Columbus, Indiana

#### **HANDY DRILL PRESS CLAMP**

Dodd Products, Inc. have recently introduced a new and useful device to the industrial field, in the shape of a Drill Press Clamp. This ingenious device will hold any shape, from paper thickness up to  $2\frac{1}{2}$ ", it is claimed by

the manufacturer. It is made from steel and cast iron. The "T" design of the clamping screw permits instant installation or removal. The various pairs of aligned notches make the clamp



flexible enough to fit any drill press with a  $7/16$ " or large slot. For complete details on this new device, write:

**Dodd Products Inc., Dept. BB**  
405 Atkins Ave.  
Lancaster, Pa.



**EFFICIENT — LOW COST  
PRODUCTION**

MEANS

**ROUSSELL**

**PUNCH  
PRESSES**

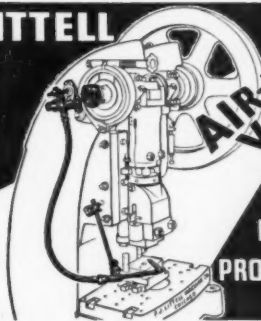
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DETAILS**

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**HORN PRESS**

**DEEP THROAT**

**SERVICE MACHINE COMPANY · CHICAGO 20,**

**LITTELL****AIR-BLAST  
VALVES****SAFER  
FASTER  
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LITTELL Air-Blast Valve automatically ejects pieces from punch presses. Keeps operator's hand out of danger zone. Increases safety and speed. Air nozzle quickly adjustable.

Other Littell safety devices include Pres-Vac Safety Feeders for picking up and feeding flat-surfaced materials; also, air-operated Mechanical Pickers for feeding pieces that vacuum lift will not pick up.

Littell makes a complete line of Automatic Reels, Feeds, Straighteners, Scrap Cutters, etc.

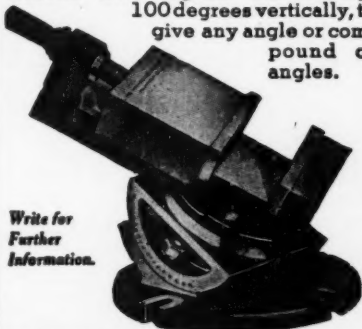
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**F.J. LITTELL MACHINE CO.**  
4153 RAVENSWOOD AVE. CHICAGO, ILL.

## New Britain UNIVERSAL VISE

**THE ORIGINAL**

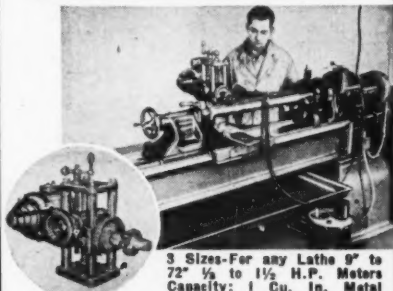
Swivels 360 degrees horizontally,  
100 degrees vertically, to  
give any angle or com-  
pound of  
angles.



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Further  
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**NEW BRITAIN TOOL & MFG. CO.**  
NEW BRITAIN, CONN., U. S. A.

## KEYWAYS A Foot A Minute With A MASTER CONVERTER



3 Sizes-For any Lathes 9" to  
72" 1/2 to 1 1/2 H.P. Motors  
Capacity: 1 Cu. In. Metal  
Per Min. Per H.P.

### BASIC MILLER and 7 Interchangeable HEADS THE MASTER LATHE CONVERTER

The world's most versatile auxiliary machine tool. Result of 14 years of designing, engineering and building multi-purpose milling and grinding attachments. Also does internal keyseating, drilling, reaming, boring, thread milling and hundreds of other metal working jobs.

**MAXIMUM PERFORMANCE MINIMUM COST***Write For Descriptive Literature***MASTER MANUFACTURING CO.**

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Centers*

*Write for  
catalog on  
live centers*

Adapted  
for heavy  
duty work.

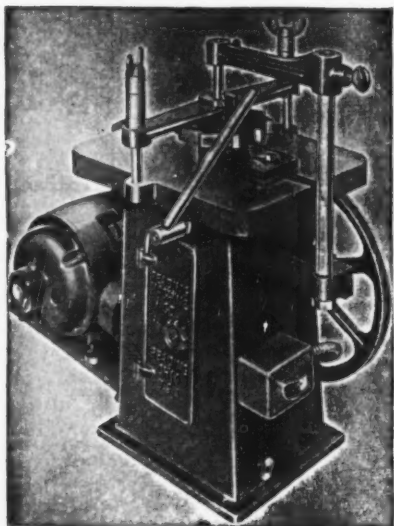
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ball and roller  
bearings assure  
maximum capac-  
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production and long  
service.



**NIELSEN, INC.** LAWTON,  
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# NO BUSHINGS, GUIDES or PILOTS NEEDED

## THE READING BROACH KEYSEATER



The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from  $\frac{1}{8}$  to  $\frac{3}{8}$  cutter. Prompt delivery—low first cost.

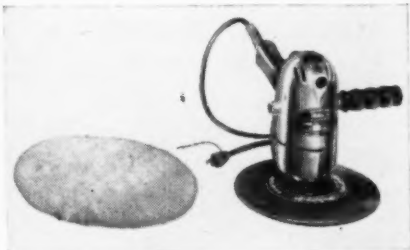
**READING MACHINE CO.**  
READING (CINCINNATI) OHIO

## BRADFORD PORTABLE ELECTRIC POLISHER

A new 10" vertical-type Portable Electric Polisher has been introduced into the line of "Metalmaster" Portable Electric Tools manufactured by The Bradford Machine Tool Co.

The model 109 Polisher has been designed to accelerate power polishing, obtaining a brilliant lustre finish on all smooth surfaces. The new unit is easy to handle in any working position, and its vertical spindle construction enables the operator to reach into difficult places. The tool is useful for obtaining a high gloss finish on all types of automotive furniture and woodwork.

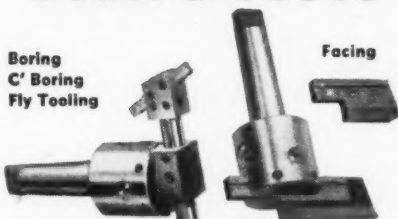
The vertical spindle construction permits easier operation, and produces a smoother-running tool, since bevel gears are not required. Power is transmitted in a straight line from motor to spindle. All gears are alloy steel, helical cut, hardened, and amply lubricated. Heavy-duty ball bearings are used throughout. A lightweight aluminum housing completely encloses the tool. The rear grip has a trigger switch with positive lock for continuous operation.



The polisher is driven with a universal a.c./d.c. 110 volt motor, 25-60 cycles, 5.5 amps, at 1000 r.p.m. free speed; 700 r.p.m. load speed. Accessories furnished include one 9" backing pad, one 10" lamb's wool bonnet, and 15 ft. of rubber-covered cable with plug and cable strain reliever. A new illustrated bulletin, giving complete specifications and construction details is available upon request. Write:

**Bradford Machine Tool Co.,**  
Dept. BB  
Cincinnati, Ohio

## CUT BORING COSTS



### BLIND HOLE BOTTOMING

Many enthusiastic users report that the Behr Boring Bar actually pays for itself in the first four weeks of operation. Just ask the man who uses one.

This new patented bar is chatter proof, extremely accurate and ultra efficient. Has interchangeable blades and accessories.

It is unequalled for versatility and efficiency.



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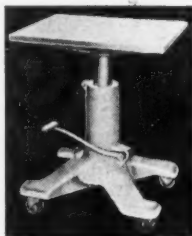
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# BEHR

Products Company  
Warren, Michigan

## PORTABLE ELEVATING TABLE



**Saves  
TIME  
and  
LABOR**

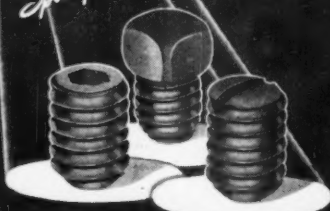
Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15 1/2", leaving operator's hands free. Table swivels and locks in any position.

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112 WEBSTER ST., DAYTON, OHIO

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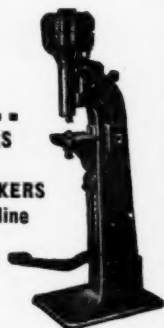
*Spotlight Progressive Industry*



**GEORGE W. MOORE, Inc.**  
100 BEAVER ST. WALTHAM, MASS.

## GRANT RIVETERS...

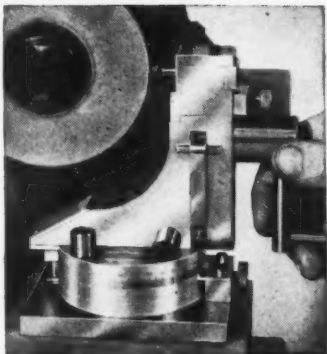
**PIONEERS  
and  
PACEMAKERS  
in their line**



—head rivets from smallest to 3/4" diameter either by **NOISELESS SPINNING** or **VIBRATING HAMMER** method—Sizes to meet all needs—Types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples.

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**Fluidmotion\***  
enables even  
a beginner  
to do perfect  
form-dressing

Fluidmotion Wheel Dressers are so simple to operate that even beginners can do the most intricate form dressing accurately. Two angles and a radius can be dressed in one continuous motion—after only one setting of the dresser. In the resulting form, angles and radii flow into each other without sharp changes of direction. These fine dressers are made of carefully selected alloy steels. Design and workmanship are of the highest quality. Several models available. Write for booklet and free form-checker.

\*Reg. U.S. Pat. Off.

**J & S TOOL CO., INC.**  
471 Main Street, East Orange, N. J.  
Representatives in Principal Cities

#### **MORTON HIGH PRODUCTION FLASH TRIMMER**

The new Morton Flash Trimming Machine is especially arranged for removing the flash or upset from strip stock or cylinders, such as barrel bands or bicycle rims, up to 4" maximum width and 3/32" maximum thickness.

The base of the machine provides the receptacle for the hydraulic fluid and operating valves. The lower housing is machined on the upper surface to form the guiding ways for the movable cylinder. It is provided with machined surfaces to accommodate the clamping jaws and for the rear piston rod support. The upper housing has machined surfaces which form the guiding surfaces for the movable cylinder and the upper ram shoe.

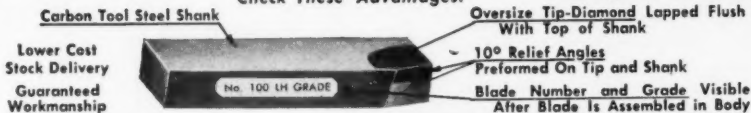


The T-shaped rams are made of steel forgings. The ram is provided with holes to accommodate tool holders and cutting tools. Bronze lined bearing surfaces are provided for supporting the cylinder in its horizontal movement. Constant cut and return stroke is provided. 1½" of vertical movement between the dies is provided for insertion and removal. The total length of ram travel may be shortened, if necessary.

For complete information, write:  
**Morton Manufacturing Co., Dept. BB**  
Muskegon Heights, Mich.

# STANDARD CARBIDE BLADES . . . For All Types of Milling Cutter Bodies

Check These Advantages:



We Fabricate All Types of Carbide Tools. Write for Bulletin No. 101 or Send Print or Sample for Quotation. Distributor Inquiries Invited.

WISCONSIN CARBIDE TOOL CO., 3343 N. 35th St., Milwaukee 10, Wis.

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The lowest-priced wire and rod cutter on the market. The hardened cutters last indefinitely.



Hand operated. A giant for work, cuts wire and rods up to 3/8-in. round or 3/8-in. square and band iron up to 1/2 in. by 2-in. Adjustable stop for repeated cuts to same length. Large or small, your shop can use a WONDER CUTTER.

Write today for prices.

THE FEDERAL FOUNDRY SUPPLY CO.

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The COLOR tells the THICKNESS



ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder.

### CONVENIENT TRIAL OFFER

Handy Spacer Assortment

10 ea. .001 — .0125 thick  
5 ea. .015 — .030 thick

### 100 SPACERS IN ALL

3/8" — \$3.10 1 1/4" — \$3.80  
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Other standard sizes also available.

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SOCKET HEAD CAP SCREWS

MILLED FROM BAR



HOLLOW SET SCREWS

MADE OF ALLOY STEEL



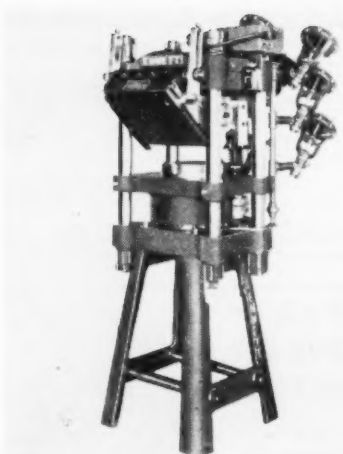
ECONOMY MACHINE PROD. CO., 5207 Lawrence Ave., Chicago 30, Ill.

### MERIT TILTING-HEAD HYDRAULIC PRESS

Emmet Machine & Manufacturing, Inc. has announced a new Merit line of tilting-head hydraulic presses, the result of more than two years of research and development. They feature positive safety devices as well as rapid operation and quality materials and workmanship.

Merit press Model No. E-113, illustrated, is available in two sizes having platens of either 14" or 24" square. They are designed for applications requiring high-speed operation, accuracy of mold register, convenience of loading, and ease of stripping molded products from press. Heated platens can be supplied upon request.

The operating speed of Model E-113 press is 3 seconds, including opening or closing of mold and tilting of head. The small press is stressed for a maximum pressure of 3000 p.s.i. (124 ton maximum) and the large press for a



pressure of 2500 p.s.i. (284 ton maximum). Pull-back operation is accomplished by means of a telescopic ram located inside the main ram. Daylight opening on both presses is made to

---

### STRAIGHT OR SPIRAL • WET OR DRY

## NO SKILL REQUIRED FOR AUTOMATIC FLUTING

Even a novice can accurately grind straight or spiral flutes from solid stock on the Wardwell Automatic Flute Grinder.

Grinds taps and reamers from 1/16 to 2"; also teeth in milling cutters, angular cutters.

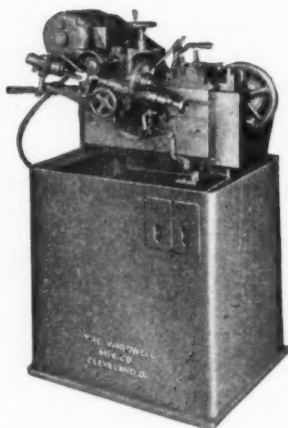
Sharpens saws in gangs up to 3 3/4" long, with diameters ranging from 1/2" up to 8".

Grinds and resharpens reamers from 1/6" up, with spacings of 2 flutes and more.

Can be adapted to many special grinding problems.

WRITE FOR BULLETIN 50FS

**Wardwell Automatic Universal Flute Grinder**  
**Produces Precision Tools With Unskilled Labor**



**THE WARDWELL MANUFACTURING CO.**  
3165 Fulton Rd. Cleveland 9, Ohio

specification. The normal stroke is  $2\frac{1}{2}$  or 6 inches in the 14 x 14 size, and 8 inches in the 24 x 24 size.

Merit presses can be furnished complete with a self-contained hydraulic power unit — valves — controls — and safety interlocks. For further construction specifications, write:

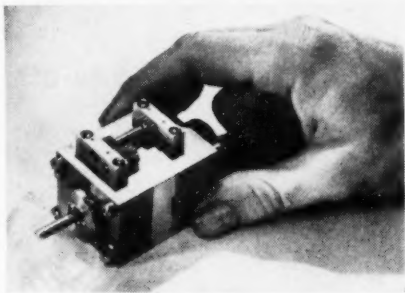
**Emmet Machine & Mfg., Inc.**  
2249-7 Fourteenth St., Dept. BB  
Akron 14, Ohio

#### CLUTCH-BRAKE SERVO-MECHANISM

A small clutch-brake type servo-mechanism has been announced by Buehler and Co., Chicago, development engineers, as a component for computers, aircraft, process control, remote positioning, and similar applications. The clutch-brake principle offers accurate servo performance with superior speed and torque outputs. Input is supplied to side gearing, allowing for the convenient stacking of several servo-mechanisms from one input shaft. Output is taken from the center

shaft.

This unit is available separately or is furnished as a complete packaged servo-mechanism with suitable amplifier for operation from power sources



of various frequencies and voltages.

For further particulars on Model 183-1, write:

**Buehler & Co., Dept. BB**  
1607 Howard St.  
Chicago 26, Ill.

**REDUCE FINISHING COSTS**  
FROM  
**30% to 90%**

**SCHAUER**  **POLISH • LAP**  
**speed lathes** **BURR • FINISH**

Plants using these low-cost, high-production machines, say: "Polishing time cut in half!" "Smoother, more uniform finish!" "Substantial savings effected in de-burring operations." In your plant, where secondary finishing operations are required — save with Schauer-A type for every purpose.

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**THE SCHAUER MACHINE CO.**

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309



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a Difference..."**

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SHIM STOCK YOU USE**

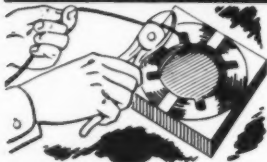


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Prove to yourself that you can save and get better results with the right shim stock when you can be sure of uniform quality, guaranteed accuracy, convenient protective packaging with Precision Brand. Select from a complete line — Brass Shim or Shim Steel in Dispenser Cartons; Four-in-One Assortment or Flat Packets of Die Cut. Send for Catalog Sheet.

**EASY-TO-USE MUSIC WIRE**



Just pull, cut, replace end! It's a time-saving dispenser carton for top quality Music Wire, available on immediate delivery in thicknesses .004" to .180". Also in bulk.

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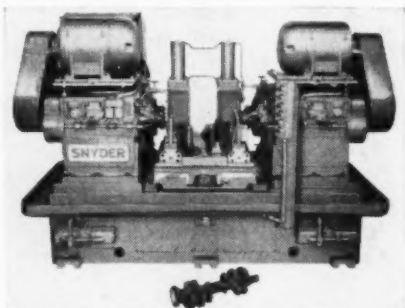
DRILL ROD  
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**PRECISION STEEL WAREHOUSE, INC.**  
MANUFACTURING DIVISION  
4409 WEST KINZIE ST., CHICAGO 24, ILL.

**SNYDER MACHINE DRILLS FORGINGS  
AT 80% EFFICIENCY**

A special-purpose machine designed and built by Snyder Tool & Engineering Co., faces and center drills the ends of crankshaft forgings at the rate of 47 pieces an hour at 80% efficiency.



The forging is located in the fixture manually and held by hydraulically-actuated clamps. When the cycle button is pressed, the fixture table advances rapidly toward the milling cutters and drops into feed, and both ends of the forging are faced to correct over-all length. Milling spindles are Timken bearing mounted. Inserted carbide milling cutters are used at a speed of 350 feet a minute.

The fixture table then returns to centering position and hydraulically actuated quills carrying the centering tool spindles advance and the drill centers in both ends of the forging. High-speed steel centering drills, operate at a tool speed of 60 feet a minute. The work cycle is fully automatic.

The machine is adaptable to a wide range of part lengths and is adjustable in speeds and feeds. The stroke is adjustable from 8" to 12". Drive is through belting and helical gears. The power is supplied by a single 15 h.p. motor. Base is welded steel construction, thoroughly normalized and ribbed for rigidity. Coolant tank is separate. Required floor space is 108" x 70". Write:

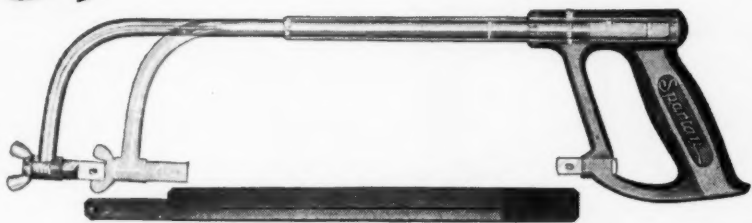
**Snyder Tool & Engineering Co.**  
E. Lafayette St., Dept. BB  
Detroit, Mich.

THE NEW

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HACK SAW FRAME!

Solid — Adjustable

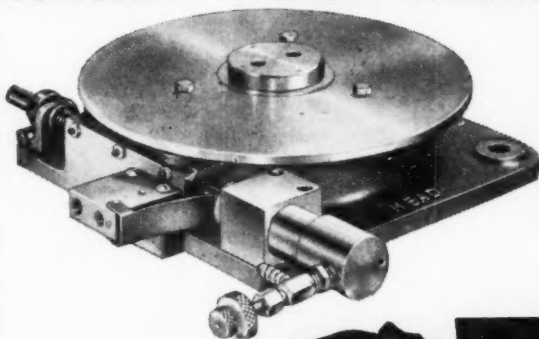


*Balanced — Rugged — Ideal for Machinists*

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**SPARTAN SAW WORKS, INC., 155 Fisk Ave., Springfield 7, Mass.**

## Air Operated ROTARY WORK FEEDER



Deftly holds and delivers small parts to drill, tap, swage, stake, etc. Stations accurate to .002". Guaranteed against over-travel or "skipping". Indexes as slow or fast as you like, up to 10,000 per hour. Compact and sturdy, easy to tool and hook up.

Standard dial plate 10"; available in 12". For a new job, simply tool up a new dial. Readily combines with "MEADOMATIC" Timer, Air Hammer, Air Press, Drill presses, etc.—to make almost completely automatic machine — operator merely loads.

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For  
Full  
Details**



**MEAD**

SPECIALTIES COMPANY

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**WHITNEY-JENSEN PRODUCTS**  
30 YEARS EXPERIENCE

## 36" FOOT SHEAR

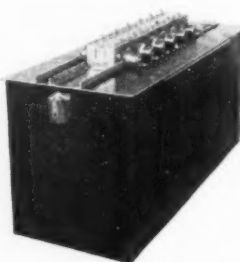
18 GA.  
CAPACITY



Built-in light fixture illuminates cutting edges of knives — making it easy for you to cut accurately to a scribed line. Write for catalog 16-49.

**WHITNEY METAL TOOL COMPANY**  
115 FORBES ST. • ROCKFORD, ILL.

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Also Pittsburgh Lock Machines, Pipe and Elbow, Beading, Turning Machines and all other Sheet Metal Working Machinery—

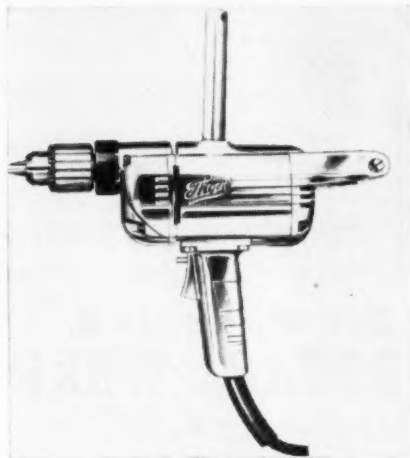
Your inquiries invited.

**Maplewood Machinery Co.**  
2634 Fullerton Ave. Chicago, Illinois

### NEW THOR 1/2" PORTABLE ELECTRIC DRILL

A new seven-pound portable electric "Silver Line" 1/2" drill is announced by the Independent Pneumatic Tool Co., manufacturers of Thor portable power tools.

The new drill is designed for continuous, stall-free drilling through toughest metals, with exceptional power in its weight class. Powerful ventilation through large slotted ports keeps the Thor heavy-duty motor constantly cool under heavy load.



This new 1/2" drill has a highly polished die casting case, a free speed of 500 r.p.m., full ball-bearing construction, removable dead handle, steel bearing inserts, removable switch handle for service, precision gearing, 3-jaw Jacobs key type chuck. The drill's length is 11". For complete specifications, write the manufacturer:

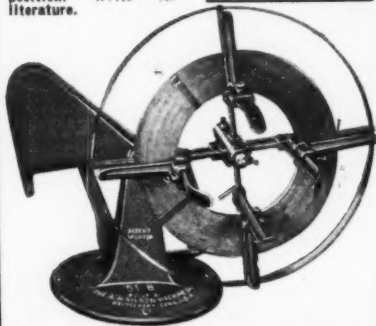
**Independent Pneumatic Tool Co.**  
175 State St., Dept. BB  
Aurora, Ill.

The Columbia Tool Steel Co., Chicago Heights, Ill., announces the appointment of **Gilbert R. Jarman** as district sales manager of the St. Louis territory.

## NILSON

## WIRE AND RIBBON STOCK REELS ★

Reel is loaded by one man in less than one minute. . . . Automatic balancer eliminates hand lifting . . . avoids strains and accidents. Locking device automatically locks reel in position. Write for literature.



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makes precision  
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products that stand up under hard  
usage . . . and build up sales through  
customer demand?

**W<sup>m</sup>H. Ottemiller Co.**

YORK, PENNA.

**. . . of course!**

Write today for the new eye-catching  
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CAP SCREWS • SET SCREWS •  
COUPLING BOLTS • and MILLED STUDS  
in all sizes and threads



**BORING, FACING &  
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For holes from 1/8"  
upward, 15 different  
sizes.

Made of Super-High-Speed Steel Specially Heat Treated  
Indispensable for your JIG BORER. The worm-  
like spiral of the boring heads provides a long,  
useful cutting surface. Their use insures perfect  
fitting threads. Correctly designed for precision  
work.

Write for Complete Data

**COMET TOOL CO.**

738 Broadway

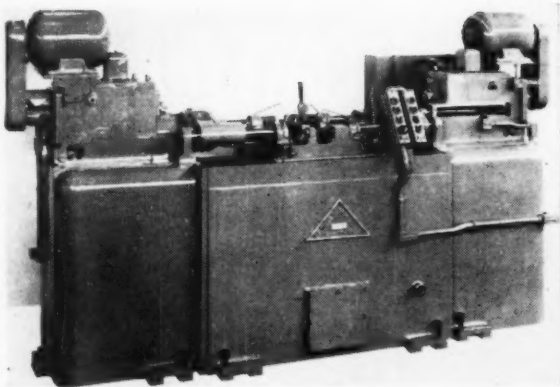
New York 3, N. Y.

## LE MAIRE HYDRAULIC FEED DRILLING UNIT

The Le Maire Tool & Manufacturing Co. has recently introduced the Model No. 1000, the smallest of their line of Hydraulic Feed Drilling units. It is driven by a 1½ or 2 h.p. motor, and since it is used with small tools that do not require a heavy thrust, a single ram only is used to provide the hydraulic feed. The feed rate is 135 inches per minute for rapid approach and return, and slow feed can be varied from ½" to 35" per minute at the turn of a dial. Movable cams, mounted on a cam bar, control the length of feed up to a maximum stroke of 4½". The same motor that drives the spindles also drives the hydraulic pump. The pump speed is kept constant with spindle speeds, being varied from 365 to 4810 r.p.m. by using various pairs of speed changing gears.

The spindle may be arranged with a flange for use in mounting a multiple spindle head as shown in the illustration, or may be used as a single spindle unit with a No. 1 or No. 2 Morse Taper. Units may be mounted horizontally, vertically, or at any angle. They are used in building up machines, as shown, or separately for application to existing machines to handle an added operation.

The particular unit shown is set up



for drilling cross holes in a steering idler arm. This machine consists of a center base and two end bases, on each of which is mounted a No. 1000 Hydraulic Unit driving and feeding a 2-spindle head. The head is mounted on guide bars, with the forward end of the guide bars supported by brackets which are an integral part of the fixture. The fixture is arranged to hold two parts, and at each cycle of the machine, .182" holes are drilled in opposite sides of a yoke on each of the two arms. Production is approximately 300 pieces per hour.

For complete data, write:

**Le Maire Tool & Mfg. Co.**  
2657 So. Telegraph Road, Dept. BB  
Dearborn, Mich.

### "FUSECOAT" PROCESS FOR WEAR PROTECTION

The "Fusecoat" process is a system for applying a fused layer of coating metal to a base metal. Both the coating metal and the base metal may be either a pure metal or an alloy, and either ferrous or non-ferrous. The base metal must have a higher melting point than the coating metal, or, as in the application of refractory coatings, a higher melting point than the binder metal. The thickness of coating applied is under control, and ranges from

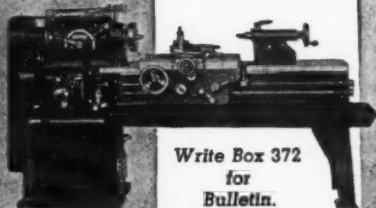
.0005" to .020" depending upon individual requirements. There is no waste of coating metal such as occurs in metal spraying. Contours which can be coated, including i.d. surface, are unlimited. The coating can be applied to any area with the uncoated area of the base metal protected from oxidation during the fusing operation.

Refractory coatings, with lower melting point metals serving as binder metals, can be applied to give the high-

**CARROLL  
AND  
JAMIESON  
LATHES  
15" AND 16"**

12 Speed Geared  
Head Motor Drive  
Timken Mounted  
Spindle

Modern Design—  
Liberal  
Dimensions

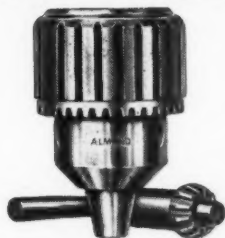


Write Box 372  
for  
Bulletin.

**THE CARROLL & JAMIESON  
MACHINE TOOL CO.**

SATAVIA OHIO, U. S. A.

**ALMOND  
DRILL CHUCKS**



Maximum gripping power with  
extreme accuracy and long life.

Write for Catalog

**T. R. ALMOND MFG. CO.  
ASHBURNHAM, MASS.  
U. S. A.**

*Little Fiver*

**HYDRO-PRESS**

**\$84.00**

FIVE TONS of smooth power  
is at your service with this  
compact and versatile tool.

The perfect press for garage,  
electric motor shop, refriger-  
ator repair and machine shop.

Will operate lying horizontal.

Ram has removable anvil and  
retracts itself when released.

Stroke 5½"  
Weight 100 lbs.



**ARTHUR J. HURT & CO.**

360 SOUTH NAVAJO STREET  
DENVER 9, COLORADO

**BAUMBACH**

**THE DIE SET  
AUTHORITY**



All Baumbach  
Die-Sets have demount-  
able Leader Pins and  
Bushings. This exclusive feature permits re-  
moving Leader pins for machine work on the  
die shoe and assures reassembly without loss  
of alignment. A big time and trouble saver.  
Write for Catalog.

**E. A. BAUMBACH MFG. CO.  
1810 S. KILBOURN AVE. CHICAGO 23, ILL.**

est possible abrasive resistance to the coated area. The refractory particles, of controlled concentration, may be made to protrude any desired distance beyond the binder metal or, if desired the two metals may be made flush with the refractory particles.

If protection is desired just for corrosion, only a very thin layer is required. A part may be given a heavy coating in one spot for protection against combined wear and corrosion, and in the same heating, covered on the remaining area with a thin coating for resistance to corrosion only.

Heating, which is necessary to obtain a fusion bond between the two metals, may be by furnace or induction but the preferred method is by a liquid bath developed especially for the "Fusecoat" process.

The "Fusecoat" process was developed by Norman W. Cole, president of the firm manufacturing "Fusecoat." For complete information, write:

**Fusion Metal Coating Co., Dept. BB**  
21820 W. Eight Mile Road  
Detroit, Mich.

#### KENDEX TOOLS WITH MECHANICALLY-HELD TIPS

A new development by Kennametal Inc., brings the advantages of mechanical holding to smaller size tools than heretofore—those with shanks  $\frac{1}{2}$ ",  $\frac{5}{8}$ ",  $\frac{3}{4}$ ", 1" square.

These tools, which are designated "Kendex," feature a flat tip that is held to a steel shank with a countersunk flat head cap screw and socket nut. The tips are made in square, round, triangular, and pentagonal shapes, of which the square is illustrated. The round tips are furnished in Grade K6 Kennametal; they are primarily for use in machining cast-iron. The other tip styles are furnished in Grades K6 or K3H, and are suitable for machining steel, cast-iron, and other metals.

"Kendex" tools are provided with indexable tips which can be rotated to provide a succession of sharp cutting edges without changing the setting of the tool holder. Grinding is eliminated; tips may be discarded when all of the

#### ISOPAC PASTE FOR SELECTIVE HARDENING

An effective method for keeping part of a workpiece soft while the rest is carburized has been developed by Denfis Chemical Laboratories, Inc. Called Isopac, it is a paste that is applied to the sections to be kept soft and left in place while the work is case-hardened.

Isopac prevents the penetration of carbon gas and insulates the protected section to prevent rapid cooling. The paste is easily removed after the work is quenched.

Isopac can be applied regardless of what method is being used to carburize the work, whether box furnace, atmosphere, or salt bath.

Isopac will replace copper plating or other expensive and time-consuming methods of isolating sections to be kept soft. The new paste will neither crack nor shrink and is guaranteed to give effective results. For complete information on Isopac and its applications, write:

**Denfis Chemical Laboratories, Inc.**  
172 Pacific St., Dept. BB  
Brooklyn 2, N. Y.

available cutting edge becomes dull. Mechanical-holding eliminates brazing strains, a common cause of tool failure. "Kendex" tools can be used to advantage in large plants where grind-



ing costs are known to be high, and in small shops where no grinding facilities are available.

For further particulars, write:  
**Kennametal, Inc., Dept. BB**  
Latrobe, Pa.

## CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

Let us have your inquiries.

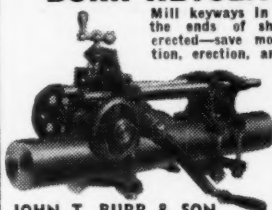
**BLOOMFIELD TOOL CORP.**

36 Farrand St.

Bloomfield, N. J.

## BURR KEYSEATERS

Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.



Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON

429 Kent Ave.,

Brooklyn, N. Y.

## NEW! INDEXING FIXTURE



Here is a new G & H fixture which can be used horizontally or vertically. . . speeds precision machining. 2, 3, 4, 6, 8, 12 and 24 indexes set on one index plate. Capacity 0 to 1/2". Write for full details.

**G & H MFG. CO.**

327 ELM STREET, FITCHBURG, MASS.



**J. L. LUCAS & SON, INC.**  
BRIDGEPORT 5, CONN.

## Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

Write for Circular  
**NIELSEN TOOL & DIE COMPANY**  
1962 W. Eleven Mile Road,  
Berkley, Mich.

## Save Space and Lifting

Yohe Racks take less floor space, hold more stock and require less lifting. Four arm rack . 51" high stacks, 10,000 lbs. Five arm rack 57" high holds 12,000 lbs. flat or round stock — at safe lifting heights. Use against wall or back-to-back in center of room.

Let us send details and prices

**WM. S. YOHE SUPPLY CO.**  
503 Mahoning Rd., N.E. Canton, Ohio

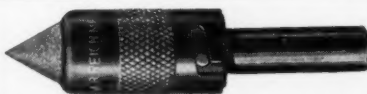


## ATLANTIC GEARS

precision-cut and inspected, on new, latest equipment. All sizes and types. Send samples or blueprints for quotation.

**ATLANTIC GEAR WORKS, INC.**

198 Lafayette St., N.Y. 12, N.Y.  
Phone CAaal 6-1441



## ABRASIVE CENT-R-LAP TOOL

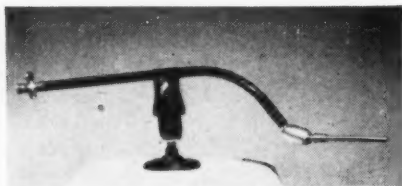
Saves time, eliminates diamond dressing. Cones changed in seconds. Available in 2 sizes 3/4" and 1 1/4" Cent-R-Laps and abrasive Cones.

Write for descriptive literature and prices.

**J. R. Reich Manufacturing Co.**  
45 E. Stroop Rd. Dayton 9, Ohio

## NEW DEVICE LOCALIZES COOLANT, OIL OR AIR

Automatic screw machines, centerless and external grinders, and other machines designed for one purpose have built in coolant or oil pumps and lines. However, in the small drill presses, milling machines, and a host of other units which serve dual purpose of dry or wet operations, the use of liquids or air becomes a problem of set-up expense, in loss of time, finding the proper brackets, wire, etc., to direct coolant, oil or air at the proper location.



The Localube unit is designed to become part of each machine that may use coolant, oil or air. It is held se-

curely to the machine with three machine screws and is designed to allow ample flexibility to direct coolant, oil or air on the desired point of most efficiency. The tip end has a 3" long,  $\frac{1}{4}$ " copper tube which can be bent if desired. Next to the tube is a flexible joint which operates on two ball joints under spring tension which compensates for wear and assures good seating facilities. This joint is adjustable at approximately  $90^\circ$  in any position. The joint is attached to  $\frac{1}{2}$ " bent tubing which allows the unit to be mounted on the outside of the machine with the bend bringing the tip to the proper location in the center of the table. The  $\frac{1}{2}$ " tube is held in position by a clamp which allows adjustment for shorter or longer distances dependent upon the type of machine and the mounting location. The unit can be adjusted out of position when running dry jobs, and made available when wet operations are desired merely by attaching the portable coolant system to the valve on the end of the unit, or by attaching air line for removing small parts from dies in press operations. Pressure cannot be built up in the unit as valve openings are smaller than any part of the unit, therefore creating flow through, rather than built up pressure within the unit. For complete specifications, write:

**Fostoria Pressed Steel Corp.,**  
Dept. BB  
Fostoria, Ohio

## DERBYSHIRE



*Fine Precision Instrument* **LATHE**  
**WIRE CHUCKS**

.004" capacity to  
**MAGNUS-ELECT** — .315"  
**D. LARGE** — .250"  
**D. WEBSTER-WHITCOMB** — .196"

**STANDARD ACCURACY**  
.0002" **ECCENTRICITY**

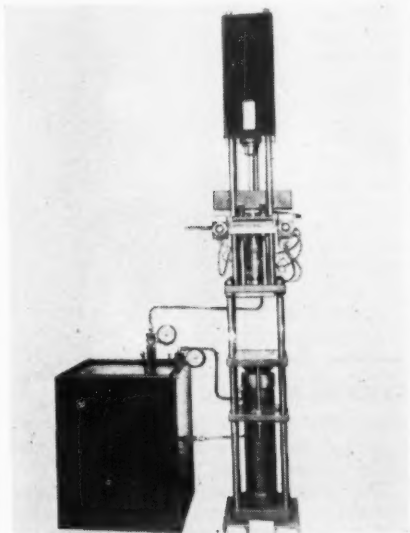
**F. W. DERBYSHIRE, INC.**  
Waltham 54, Massachusetts

## MUNTON INJECTION MOLDING PRESS

Designed for all types of plastics, the new Munton Injection Molding Press is specifically designed for machine molding of Nylon. It handles this difficult material with ease by using a lever to cut off the sprue which eliminates seepage, screens and gadgets. The lever is not used with regular plastics.

A completely new type heating tube plasticizes about 20 pounds of plastic per hour, (some users claim more). This tube is chrome plated on the inside and does not use the conventional type torpedo. Band heaters and cart-

ridge heaters can be checked and changed from outside the tube. Tips as well as tube itself can be easily changed. All heater wires are con-



nected with plugs for quick and simple change. A special dual heat control permits upper part of heating tube to be set 75° to 100° cooler than bottom of tube. The plunger tip raises out of the heating tube so that it has time to be air cooled between shots.

The press is equipped with a 5 h.p., 220-440 volt motor and a belt driven, 6-cylinder hydraulic pump. All parts including reservoir, cylinders, domes, caps, valves, and chrome plated piston rods are made of steel. Steel tubing is used on all high pressure lines.

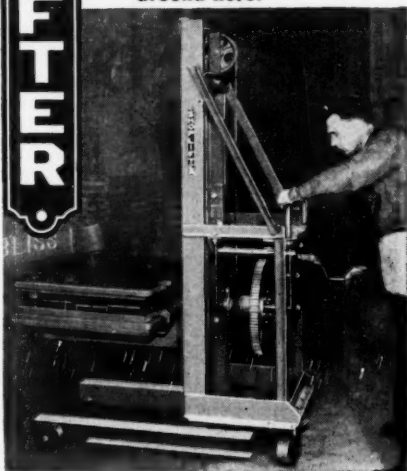
The unit develops 30 ton mold clamping pressure adjustable with maximum of 14,000 pounds injection pressure. Operator fatigue is held to a minimum by use of hand operated levers instead of foot pedals. Complete details can be obtained by writing:

**Munton Mfg. Co., Dept. BB**  
9400 Belmont Ave.,  
Franklin Park, Ill.

# SHOPLIFTER



... let an Economy SHOP-LIFTER do the heavy work around here.



Every shop needs a SHOPLIFTER. Saves men, saves materials. Besides handling heavy dies, the SHOP-LIFTER can stack drums and boxes, unload street trucks, pick up skids and be used as an adjustable height table.

All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height.

## 500 pound capacity

Type D, hand operated.....\$157.50  
Type DE, electric 1/3 HP unit.....\$315.00

## 1000 pound capacity

Type DX, hand operated.....\$320.00

## 2000 pound capacity

Type DX, hand operated.....\$370.00

Floor lock to hold machine steady:

\$10.00 extra for 500 pound sizes;

\$15.00 extra for type DX models.

**ECONOMY ENGINEERING COMPANY**

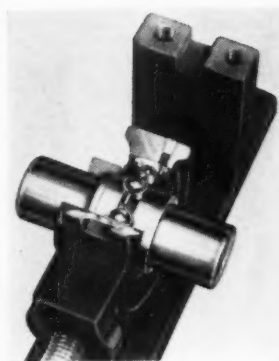
4505 W. LAKE STREET • CHICAGO 24, ILL.

### NEW FAFNIR TAKE-UP UNITS

An an addition to its line of Mechani-Seal Ball Bearing power transmission units, The Fafnir Bearing Company announces a new series of take-up units. Especially adaptable for conveyor construction, shaft adjustment and belt tightening devices, the new series is designated Type LTU. In shaft sizes ranging from  $\frac{3}{4}$ " to 2-7/16", these units incorporate pre-lubricated, self-aligning Fafnir wide inner ring ball bearings with self-locking collars and frictionless Mechani-Seals.

Mechani-Seal construction provides the effective sealing operation of an unusually long labyrinth plus that of an external slinger. An inner steel plate shield attached to the bearing's outer ring retains the lubricant, while a rotary slinger attached to the bearing's inner ring throws off contaminants. For further information about Type LTU Units, address:

T. L. Hunt, Advertising Manager, at:  
**The Fafnir Bearing Co., Dept. BB**  
New Britain, Conn.



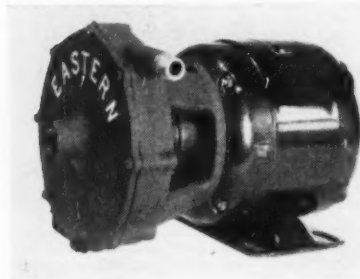
### CENTRIFUGAL PUMP IN BRONZE OR ALUMINUM

Eastern Industries, Inc., has developed a new centrifugal pump designated as Model H. This unit is designed specially for applications where moderate pres-

sure of 19 p.s.i., 10 g.p.m. at 15 p.s.i., 15 g.p.m. at 10 p.s.i. and in excess of 20 g.p.m. at free flow.

The pump is constructed in either bronze or aluminum, with a lifetime mechanical rotary seal. The inlet is  $\frac{1}{2}$ " N. P. T. female and the outlet is  $\frac{3}{8}$ " N. P. T. male. An  $\frac{1}{8}$ " N. P. T. drain plug is located in the pump body. Units are available with motors ranging from 1/6 h.p. to 1/3 h.p. depending on operating range desired. With 1/6 h.p. motor, the overall size is  $12\frac{1}{8}$ " long x  $7\frac{3}{8}$ " high x 8-3/16" wide and the weight in bronze construction is 37 pounds. Model H pump is an efficient slow speed, centrifugal pump designed for long free applications according to its manufacturers. The pump is available for sample on a trial basis. For further data, write:

**Eastern Industries, Inc.,**  
296 Elm St., Dept. BB  
New Haven 6, Conn.



sures and volumes are required from a centrifugal pump running at 1725 r.p.m. The performance curve on the new Model H indicates a shut-off pres-

### VICTOR ANNOUNCES NEW FLUXES

Victor Equipment Company announces the development of four new fluxes: Victor No. 3 Flux for brazing brass and bronze, steel, clean cast and malleable iron. No. 5 Flux for moderate heat

brazing of cast and malleable iron. It is recommended for "tinning" dirty castings. No. 7 Flux for high heat brazing of cast and malleable iron where the base metal gets exceptionally hot.

No. 9 Flux for fast welding of cast iron. Will not cake when container is subjected to moderately high heat.

The manufacturer claims these new fluxes fulfill all the following Flux requirements:

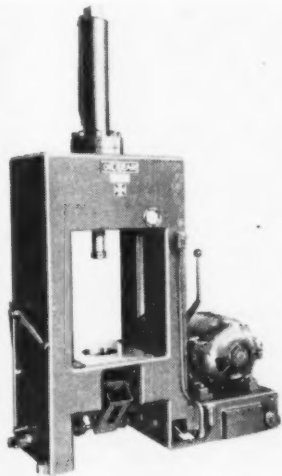
They clean both parent and filler metal. They cling to the heated rod when it is dipped into the flux. They do not blow off rod. They leave the finished braze clean. They contain no toxic ingredients. They "tin" burned spots in cast iron brazing. They do not encourage cooling of cast iron welds.

For details, write:

**Victor Equipment Co., Dept. BB**  
844 Folsom St.  
San Francisco 7, Calif.

#### **OILGEAR 2-COLUMN VERTICAL PRESS**

A wide variety of agricultural implement and tractor parts are swaged, broached, and burnished to size on this Press manufactured by The Oilgear Company. The unit is equipped with



a hand lever operated, spring returned broach receiver basket and a hand lever and foot pedal control to an Oilgear 2-Way variable delivery pump which is direct connected to a 25 h.p. electric motor. Maximum tonnage of the press can be varied from 5 to 25

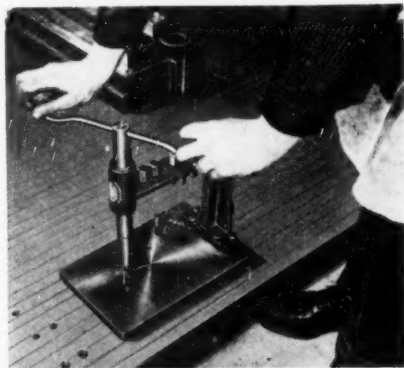
tons, through a convenient micro adjustable relief valve on the right hand side of the frame. The press is also used for straightening malleable castings.

The general specifications include a stroke of 24"; the daylight opening of the unit is 30". The distance between the columns is 24"; the distance, front to back is 24". The hole in the table is 9"; table height is 24". The ram speed down is variable up to 270" per minute; the ram speed up is variable up to 540" per minute. The net weight of the press is 6500 pounds. For additional information, write:

**The Oilgear Company, Dept. BB**  
1348 W. Bruce St.  
Milwaukee 4, Wis.

#### **NEW PORTABLE TAP GUIDE**

The Dahlstrom Manufacturing Co. announce a new model Dahlstrom Tap Guide. As illustrated, this tapper can be carried to big jobs. It taps through an opening in the base.



The unit accurately guides taps to eliminate breakage. As a hand operation, it takes just a few turns of the spindle; it winds through continuously, with no backoffs. It is 13" long, 8" wide and 14" high. The tool includes seven adaptors 8-32 to 1/2". For complete data, write:

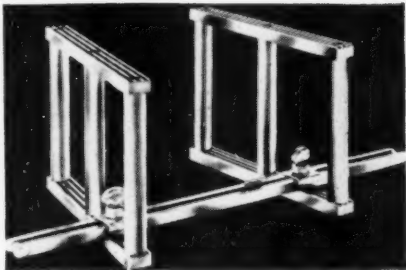
**The Dahlstrom Mfg. Co., Dept. BB**  
2506 Larpenteur Ave.  
St. Paul 8, Minn.

## PARALLEL UNITS CONTRIBUTE TO MACHINING ACCURACY

A new patented safety Parallel Unit is announced by Acro Die and Stamping Co. According to the designers, it eliminates makeshift methods of supporting tools, dies, jigs, etc., in operations such as drilling, counterboring, tapping, milling and grinding.

Its safety features tend to reduce injuries often caused by makeshift methods of work support. The parallel unit contributes in speeding up various operations; it eliminates costly errors due to inaccurate support of tool and machine work.

The device consists of two parallel units joined together on an adjusting rail with only two thumb screws to manipulate for adjustment to any desired spread. Available in 3, 5, and 7-inch heights, 20 inch spread. It is hard-



ened, precision ground and comes in standard, as well as heavy duty types. Direct inquiries to:

**Acro Die & Stamping Co., Dept. BB**  
5328 N. Kedzie Ave.  
Chicago 25, Ill.

## VACUUM-TUBE HIGH FREQUENCY HEATING UNIT

Suitable for heating non-ferrous as well as ferrous materials to desired temperature, a new vacuum-tube high-frequency heating unit is announced by Lepel High Frequency Laboratories, Inc. It can be used for hardening, soldering, brazing, or melting.



The unit is stated to be the latest development in electronic tube-type high-frequency equipment. The vacuum-tube machine was brought out as a companion machine to the recently announced spark-gap type heating unit for those who prefer to use the tube-type unit. The 20 kilowatt output of the tube machine, according to the manufacturer, is the same output as that of the spark-gap unit with 30 kilowatt input.

Housed in a sturdy, all-steel cabinet, the unit is provided with heavy duty industrial type vacuum tubes, as well as grounded load coils, and permits use of flexible or rigid leads up to eight feet in length. The machine consumes only one gallon of water per minute when idling, and less than five gallons at full load. The vacuum-tube unit is easily adjusted to any load, and requires no matching transformers or condensers.

For complete information on this new unit, write:

**Lepel High Frequency Laboratories, Inc.**  
39 W. 60th St., Dept. BB  
New York, N. Y.

### HIGH SPEED ELECTRO PUNCH

A new high speed model has been added to the line of Electro Punches manufactured by Black & Webster, Inc. This new model BS-1 incorporates a high temperature silicone insulated coil in a ruggedly constructed solenoid which permits it to operate continuously at better than 150 cycles or blows per minute, delivering an impact of more than a ton.

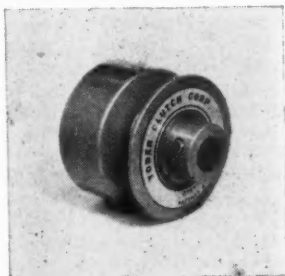
The new model is suitable for staking, riveting, marking, wire cutting, blanking, forming and drawing of metals, plastics, etc., but is particularly designed for high speed operation.

Weighing only 45 lbs. and needing less than 1 square foot of bench space, this electric impact hammer has a variety of uses where speed and high production rates are important in the field of automatic, semi-automatic or manual operation. For complete specifications, write:

**Black & Webster, Inc., Dept. BB**  
30 Pleasant St.  
Needham 92, Mass.

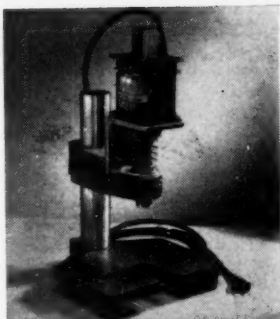
### NEW COMPACT AUTOMATIC CENTRIFUGAL CLUTCH

Yoder Clutch Corporation announces a new compact type of automatic centrifugal clutch,  $2\frac{1}{4}$ " outside diameter by  $1\frac{1}{2}$ " overall length, including a standard 2" V-Belt sheave. The device is adaptable to all standard fractional horse-power electrical or internal combustion units. This reversible unit may



be applied to any assembly where high starting torque characteristics are desired, such as air compressors or pumps. Engagement is predetermined in relation to application. The clutch can be used on original equipment or as a replacement. For details, write:

**Yoder Clutch Corp., Dept. BB**  
Orrville, Ohio



### MOLDISC FOR ROTARY SANDERS

Development of the Manhattan Moldisc, a bonded disc wheel for rotary sanders, has been announced by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, New Jersey. It is said the disc fills a need for a bonded wheel for portable grinding tools that lasts longer than a coated abrasive sanding disc and is more easily handled than a flaring cup wheel.

According to the manufacturer, these discs have the fast free cutting qualities necessary in fabricating stainless steel and other alloys which must be ground and finished without generating excessive heat. It is also claimed that in certain bond modifications, the flexibility or resiliency imparted to the Manhattan Moldisc makes it possible to produce superior finishes more readily than is done with coated abrasives of a comparable grit size. Other advantages are said to be: much longer life, uniform cutting action, increased production, reduced grinding costs, ease in handling, less operator fatigue, and greater safety.

The manufacturer states Manhattan Moldiscs may be specified for roughing and fast metal removal as well as for finishing operations. They are supplied in a standard 7" diameter,  $\frac{1}{4}$ " thickness and  $\frac{7}{8}$ " hole. Speeds up to 6000 r.p.m. for the 7" discs are recommended for best operating efficiency.

**Raybestos-Manhattan, Inc., Dept. BB**  
Manhattan Rubber Division  
Passaic, N. J.

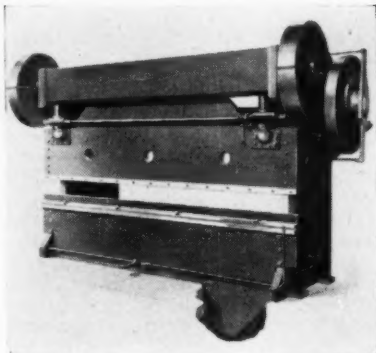
## POWER PRESS BRAKES AVAILABLE IN 120 TO 900 TON RANGE

Columbia Machinery and Engineering Corp. has expanded its line of power press brakes to include a range of sizes from 120 to 900 tons. This expansion of the line gives metal fabricators a choice of models for forming mild steel from  $\frac{1}{8}$ " to 1" thick in lengths from 4 to 20 feet.

All sizes except the 120-ton model now employ twin-drive main gears. Back gears in all models operate in oil within an oil-tight case. Precision machine-cut steel gears are used throughout.

All models have motor-driven slide-adjustments with micro-meter controls, motor and control being accessible to the operator. The slide is easily operated and can be adjusted out of parallel with the base. Slide ways are designed to provide full bearing with the housing guides, even when the slide is operated out of parallel. Counters on each end indicate the magnitude of the adjustment in thousandths of an inch.

Dependable operation is assured by a manually-operated multiple-disc friction clutch. A drum-type friction brake stops and holds the slide at any point of the stroke. A wedge-type release mechanism relieves the ram in case



dies are bottomed to the extent that the brake stalls.

All models are rigidly constructed of heavy rolled-steel plate, arc-welded, to provide a maximum deflection of .001" per foot of machine width. For complete specifications and auxiliary equipment on this new line, write the manufacturer:

**Columbia Machinery & Engr. Corp.**  
Dept. BB  
Hamilton, Ohio

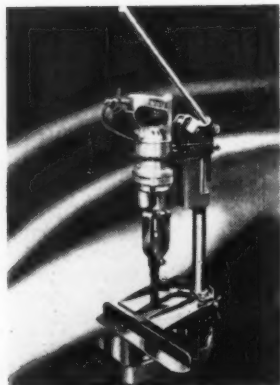
## WOLF ELECTRIC CHISEL MORTISER

A portable electric chisel mortiser, which will reduce costs in general maintenance by replacing hand tool operation, has just been made available for the first time, by S. Wolf & Company, Ltd., London, England, manufacturer of portable electric tools.

The tool is adaptable to a wide range of uses and accessories in both factory and field. It is quickly adjustable to various sizes of mortise. It serves as both a bench drill and a hand drill. Also, when used with a bench clamp stand, it is a bench grinder. With auxiliary handle and 8-inch buffing head, it is an efficient polishing tool.

Its steel drilling capacity is  $\frac{5}{16}$ " diameter. The speed on full load is 800 r.p.m., 110-120 volts universal, a.c. or d.c. For details, write the manufacturer's U. S. representative:

**Fred L. Stuart**  
Room 1111, 33 W. 42nd St.  
New York 18, N. Y.



### FIXTURE TRANSFORMS PRESS INTO MARKING MACHINE

The Acromark Co. has developed a simple fixture for a foot or arbor press that gives efficient, high production marking of cylindrical, flat or other shaped parts. By using a v-block as a nest or stamping block assembly in a foot, punch or arbor press, cylindrical and other shaped parts can be stamped with parts numbers or other identification at a rapid rate.

The stamping die may be either flat or sharp face, engraved on a flat surface, because the lettering or numbering, if not too large, will stamp full upon the cylindrical surface, unless the cylinder or rod radius is less than double the size of the characters to be marked.

The illustration at the right shows a typical example of such a set-up. It is a foot press with a shank style stamping die in the ram and a v-block in the shoe, centered so that when a bushing or other cylindrical part is placed on it, the press blow will stamp the mark in the exact center of the part, regardless of its diameter, but above the heretofore mentioned limits.

Further information concerning such simple assemblies for utilizing a free arbor, foot and punch press for marking parts will be furnished upon application. Write:

**The Acromark Co., Dept. BB**  
15-Morrell St.  
Elizabeth 4, N. J.



### NEW TEMCO ELECTRIC FURNACE

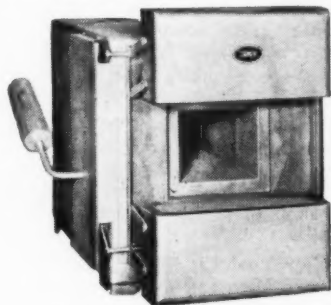
The new Series 1700 Temco electric furnaces announced by Thermo Electric Mfg. Co. employ an ingenious door arrangement. To permit access to the heating chamber with minimum loss of heat, the insulated door has been divided into an upper and lower section, both controlled by a single counter-balanced lever. By moving the lever from the forward position to vertical, the lower section is lowered separately while the upper section remains in place. A further 60° movement of the lever will raise the top section and expose the full chamber. Both door sections move on parallel levers in a vertical plane with the hot side always away from the operator. Ledges of insulation on the inside of the door sections project into the heating chamber for heat seal in the closed position.

These furnaces are supplied with either a Temcometer temperature controlling and indicating instrument or with an electronic controlling pyrometer. With the Temcometer the furnace temperature is controlled by adjustment of the knob on the instrument panel which regulates the current input anywhere between 5% and 100% time "on" and permits any temperature from 350° F. to maximum to be selected and held. The electronic controlling pyrometer can be pre-set for the desired temperature. The furnaces may be operated continuously up to 1650° F. and intermittently to 1900° F.

The 1700 Series is built with a chamber opening of 8½"x7½" and in depths of either 13½" or 18". Operation is on 230 volts, 50/60 cycles, single phase.

For complete specifications, write:

**Thermo Electric Mfg. Co., Dept. BB**  
486 W. Locust St.  
Dubuque, Iowa



### NEW BEVERLY SLITTING SHEAR

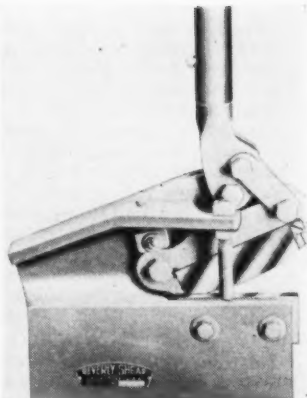
A new portable Slitting Shear, the Model S-3, with a slitting capacity of  $\frac{1}{4}$ " in mild steel and 10 gauge in Stainless, has recently been introduced by The Beverly Shear Manufacturing Co. A unique adjustable shoe, which provides additional support at the toe of the upper blade holder, is said to give increased strength and cutting efficiency. A heavy frame is used to provide the necessary rigidity and strength to assure sharp, clean cutting and to prevent any side play or movement of the blades when making cuts in heavy gauge steel.

Easy, effortless operation is assured by the powerful toggle action of the upper blade holder.

Shear Blades are interchangeable and adjustable. The Shear is furnished with tempered and drawn tool steel blades or high carbon high chrome blades for working in Stainless Steel.

For further information on this new product, write:

**The Beverly Shear Mfg. Co.**  
3009 W. 110th Place, Dept. BB  
Chicago, Ill.



### KELLER PRESENTS NEW TOOL BALANCER

In line with the efficiency trend to keep work spaces clear and yet have tools within easy reach of operation, Keller Tool Co. announces a new, portable Tool Balancer. This device suspends tools weighing up to ten pounds near the working area for instant use. It is adjustable to all tool types, and remains vertical under all operating conditions. The working range is six feet.

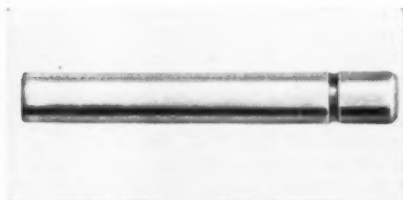
Little effort is required to bring tools to the job, the manufacturer states. At the completion of the operation, the tool is released and returns to its pre-adjusted position near the work area. Adjustments of the "up" position are made by moving a clamp and rubber bumper up or down on the Balancer's wire rope. Cable tension is regulated with nut and lock, both on the same side of the Balancer.

The housing of the Keller Balancer is aluminum, with a clock-type suspension spring mounted on oilless bearings. The entire unit weighs  $5\frac{3}{4}$  pounds. For complete information, write the manufacturer:

**Keller Tool Co., Dept. BB**  
Grand Haven, Mich.

### BONNEY PLASTIC DRIFTS

The Bonney Forge and Tool Works have announced a new tool called a Plastic Drift. These Plastic Drifts are useful tools for operations where it is desired to avoid marking or damaging finished parts. They are also useful for driving our grease retainers and bearings.



Bonney Plastic Drifts are made of tough plastic material which stands up under severe pounding. These Drifts are six inches in length and come in three different sizes, with  $\frac{3}{4}$ ",  $\frac{7}{8}$ ", and 1" outside diameters. For complete information, write:

**Bonney Forge & Tool Works, Dept. BB**  
Allentown, Pa.

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**\$40**



No. 00C Friction  
**\$45**

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SUPER SENSITIVE  
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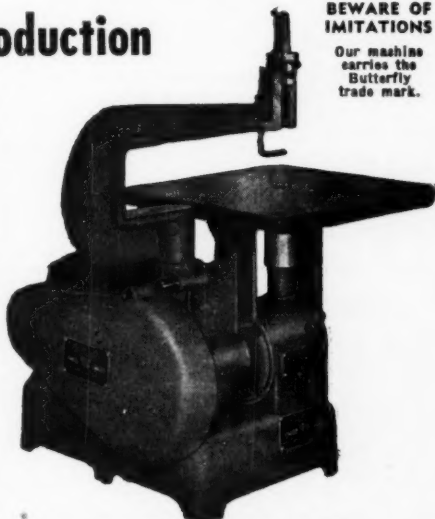
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The amazing performance of the Ingersoll-Rand electric Impacttool is hard to believe unless you see it in action—it saves up to 90% on nut running time—has full power in either direction—no motor burn-outs, motor continues to run even if spindle is stalled—it is the greatest labor-saving, time-saving electric tool ever offered.

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- Runs Wire Brushes
- Bore Wood

#### **CARBIDE DIE CONSTRUCTION**

For the past several years, Carbide dies have been taking the place of other die materials in almost every phase of the stamping, forming, and drawing of metals. In the past year, the Carbide die program has been greatly accelerated, due largely to the efforts of the Carbide manufacturers and a few of the foremost precision die builders of the country. Of these, the Allegheney Ludlum Steel Corporation played an important

part, being a major producer of Carbide; and with one of the largest lamination stamping departments in the country, a very natural setup for Carbide die development was presented. Tests were run, dies were built, and results were obtained. All types of dies were built, tried, and developed. Methods of construction were developed and standard procedures adopted.

Although the Carbide die building program has developed rapidly, it does not play the part in American high production which it should, largely because Carbide is still considered by many as a hard, brittle material which cannot be machine ground, will not resist shock, or stand strain in any manner.

In order to familiarize die users with practices generally adopted in the manufacture and construction of Carbide dies, this discussion is broken down into four steps general-

ly considered when building Carbide dies, and for simplification the discussion is based on building a simple draw die for the first draw operation in a deep draw job, using 1/16" cold rolled material having an I.D. of 4".

#### **I. The Carbide and Proper Support**

##### **II. Diamond Boring**

##### **III. Grinding**

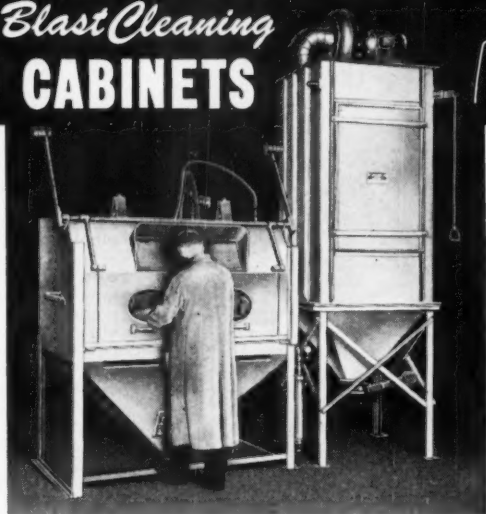
##### **IV. Lapping**

#### **I. The Carbide Methods of Holding and Proper Support**

In an effort to keep the cost of this ring down to a minimum, the first thing to be considered is the minimum amount of

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Manufacturers and Engineers SAND BLAST AND DUST  
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Carbide to be used. In this case, since the I.D. is to be 4", through past experience, we know that a 3/4" side wall will be necessary, thus the O.D. will be 5-1/2" x 3/4" thick. Since the Carbide must be backed up and supported as rigidly as possible, much caution must be used in selecting the case material. The O.D. and thickness of the case should be as large and thick as the machine setup in which it is to be used will permit. In this case, we will use a tool steel forging (ALSC Saratoga) 9" O.D. x 4" thick. As the Carbide must be supported

as closely as possible, a shrink fit on this ring is necessary. We have set up a table for Carbide rounds of recommended shrink fits which we follow very closely. Making a shrink fit of Carbide against tool steel is greatly helped by the differences of the coefficient of thermal expansion, the coefficient of expansion of Carbide being only one-half that of steel. In casing this ring, the case will only need heating to approximately 700 degrees Fahrenheit, which is below the draw temperature of the steel case. Thus, the hardness of the case will not be affected. The casing operation is usually done before the I.D. of the Carbide is finished.

The Carbide in this particular case will close in approximately .002" on the I.D. By doing the shrinking before finishing the I.D., we save ourselves the operation of resizing the ring. The table at the end of this

article represents the amount of shrinkage used in shrinking Carbide nibs into tool steel casings.

#### **II. Diamond Boring**

Diamond boring is used on dies with one or more radii, or with contours which would be difficult to produce with a straight diamond wheel. The dressing of diamond wheels to suit certain contours, angles, or radii is quite limited and costly in respect to labor and the initial cost of the diamond wheel. Therefore, in the case of the above-mentioned draw ring, the drawing radius is 5/16",

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wheel runs as near true as possible. The wheel should be indicated on all surfaces and once it is tightened on the mount, should never be taken off that particular mount. These wheels may be trued very efficiently by using a truing setup with a silicon carbide wheel. The silicon carbide truing wheel in this case is not power driven but is turned only by the diamond wheel revolving against it. In dressing a radius on a diamond wheel, a very common practice is to use a Radii Dresser on which is mounted a high speed grinder, with a silicon carbide wheel revolving in the opposite direction of the diamond wheel. The the dresser and the entire grinder is swung. Very active radii may be dressed in this manner. However, if a radius with a close tolerance is desired, the radii dresser should be reset several times during the operation. In surface

and this radius would be worked out with a diamond boring tool. A speed of approximately 100 to 120 surface feet per minute would be used. .002" depth of cut and .004" feed per revolution would give best results. Lapping stock of .001" to .002" should be left on the radius or in the cavity after diamond boring.

### III. Grinding.

A 100 grit vitrified diamond wheel 100 concentration, should be used for roughing a 180 to 220 grit wheel with the same concentration for finishing. When mounting a new diamond wheel, extreme care should be taken to make certain the

grinding Carbide with a diamond wheel, a very common practice is to use approximately .0002" depth of cut, and approximately .0005" cross feed. About .001" to .002" stock should be left on the piece for lapping.

### IV. Lapping

It is an established fact that Carbide dies work best, and give the longest life, when lapped and polished to a high finish. This is an easy task when proper methods and materials are applied. When polishing a round draw ring, such as previously discussed, best results should be attained at a speed of 1400 to 1600

surface feet per minute. A brass pin, mounted in a hand grinder, coated with diamond powder and suspended in olive oil, will very easily remove the grinding or boring marks. A wooden lap, mounted on a pin, held in a hand grinder and coated with No. 5 diamond powder and olive oil, will produce a satin finish. This should be followed by an operation in which a felt polishing wheel replaces the wooden wheel used in the previous operation. Medical cotton, wrapped around a piece of wood, will produce the same results. In lapping small holes, cotton, twisted on a small wooden pin, in usually the answer. A very small amount of No. 5 diamond paste is used in this operation. If an extremely high polish is desired, the same procedure should be repeated, using No. 6 diamond paste.

#### RECOMMENDED SHRINK FITS CARBIDE ROUNDS

NIB RANGE FROM	O. D. UNDER	SHRINK ALLOWANCE
0.437	0.562	.0013-.0018
0.562	0.687	.0016-.0021
0.687	0.812	.0021-.0026
0.812	0.937	.0025-.0030
0.937	1.125	.0028-.0033
1.125	1.375	.0035-.0045
1.375	1.750	.0038-.0048
1.750	2.000	.0043-.0053
2.000	3.000	.0045-.005
3.000	3.500	.0053-.006
3.500	4.000	.0065-.007
4.000	5.000	.007-.008
5.000	6.000	.008-.009
6.000	7.000	.009-.010

#### 125-TON HYDRAULIC PRESS

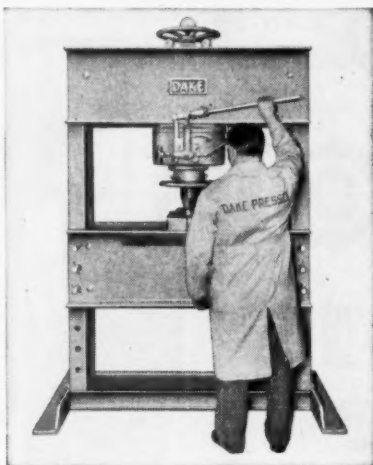
A new 125-ton hydraulic press, sturdy addition to the Duke line of presses, has been announced by its manufacturer, Duke Engine Company.

The new press, available either in hand-operated, air operated, or electrically operated models, has been developed for use in tool and die shops, general machine shops, heat-treating plants, welding shops, and foundries.

The new model has an 8-inch stroke with an additional 8-inch adjustment available by auxiliary screw-type ram. Special frame sizes are also available. Air models are built to operate from either 90-pound or 145-pound air pressure.

Safety features include a by-pass relief valve to prevent over-extending the ram, and safety valves on the air and

electric models to guard against over-loading. Width between the press up-rights measures 48 inches; 12¼ inches between table channels.



For complete information, write:  
**Duke Engine Co., Dept. B8**  
**Grand Haven, Mich.**

#### NEW MODEL 3-A AIR BACKSTAND

The Hammond Model 3-A Air Backstand was designed for heavy production grinding or polishing with abrasive belts. This machine is equipped with an air actuated cylinder which automatically maintains correct belt tension—compensating immediately for a fraction of an inch of belt stretch. Various pieces of material require different belt tension; after the correct tension is determined, the operator merely sets the pressure regulator valve.

The Model 3A is of heavy cast-iron construction except for its stainless steel 12" diameter, 7" face idler pulley. The pulley is diametrically balanced and runs on high quality sealed ball-bearings.

Descriptive literature on this unit is available. Write:

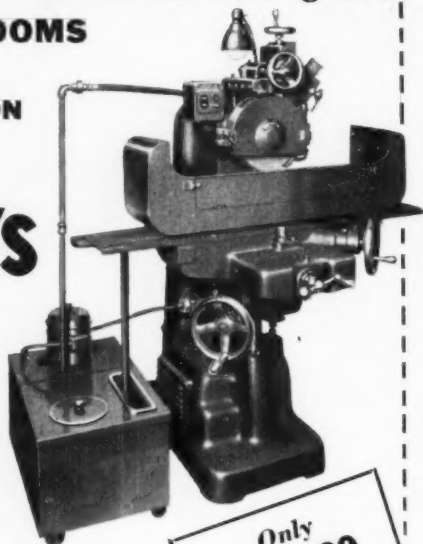
**Hammond Machinery Builders**  
**1614 Douglas Ave., Dept. GP-16**  
**Kalamazoo 54F, Mich.**

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## NEW RUST INHIBITOR

Metallurgists of the Jones & Laughlin Steel Corporation report that a new phosphate material which inhibits rusts and helps lubricate wire in process now permits a 20 to 25 per cent increase in the speed of drawing fine high-carbon wire.

The new material, known as "Banox" and described by the manufacturer, Calgon, Inc., as an amorphous metaphosphate compound, has been in use at J&L's Aliquippa (Pa.) wire mill since

June, 1947. Calgon service engineers report this is the first application of Banox in wire-drawing, although it has been effectively employed by manufacturers of household appliances, metal furniture, and automotive bodies and parts, as a rust-proofing and paint-bonding coating prior to painting.

Protection of the wire against rusting while in process not only has permitted an increase in drawing speed but also has meant a sharp reduction in damage to dies and to wire, and fewer delays for replacing and restringing dies, the J&L metallurgists explain.

Because the Banox film deposited on the wire is not water-soluble, and assures a degree of lubrication for the wire in subsequent drawing, the amount of lime picked up to carry lubricant is not critical as in conventional practice, it is added. Formerly, a light coat of lime or a too-heavy "flaky"

coat required redipping of the coil; otherwise, too little lime frequently resulted in insufficient lubrication, with damage to dies and wire, and too heavy a lime coat would flake off, exposing bare wire with much the same results.

Less lime may be used safely when the phosphate material Banox is incorporated in the "cleaning" operation, the J&L men also report.

Rust is a particularly serious problem in such a mill, draw bench operators say.

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### TURBINE ENGINE ANNOUNCED

Details on how a new, high-powered turbine engine of American design for aircraft—the new Wright T-35 "Typhoon"—has been undergoing flight tests in a "five-engined", high-altitude flying laboratory" converted from a bomber, have been disclosed with the approval of the U. S. Air Force by Wright Aeronautical Corporation, of Wood-Ridge, N. J., engine-building division of Curtiss-Wright Corporation.



Lighter, smaller in diameter, it affords easier tapping close to walls or shoulders, eliminates "chewed up" tap shanks.

Designed and developed by the Wright Company for the U. S. Air Force to conform to American requirements and production techniques, the new "Typhoon" gas turbine engine installed in this "flying laboratory" has been subjected to a series of unprecedented tests to confirm its power output, lubrication, fuel consumption and general performance in flight. Results of the tests are withheld by the Air Force, sponsor of the turn and test program.

To test this new American-designed turbine under actual flight conditions and thereby speed up its development and early use by the U. S. Air Force, Wright engineers conceived the idea of a real "flying laboratory"—the first of its kind ever designed for testing power plants. A B-17 Flying Fortress, basically similar to thousands operated during World War II, was obtained and modified, largely by its

builders, the Boeing Aircraft Company.

To accommodate the huge "Typhoon", the cockpit was moved aft four feet, the nose extended, the fuselage completely reinforced and heavier frames and outer skins installed. Then, the new power plant, equipped with a four-bladed Curtiss electric propeller, was mounted in the nose section formerly occupied by the bombardier.

With this "flying laboratory" Wright engineers point out that they have rigorously tested the new "Typhoon" engine-nacelle-propeller combination at high altitudes under actual service conditions.

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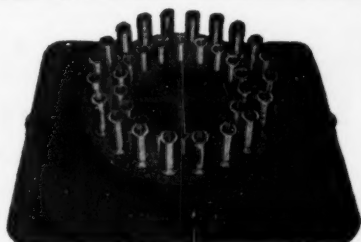
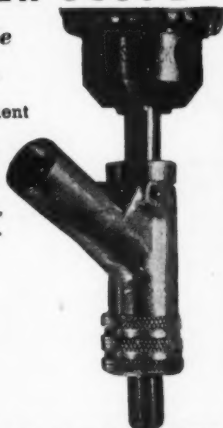
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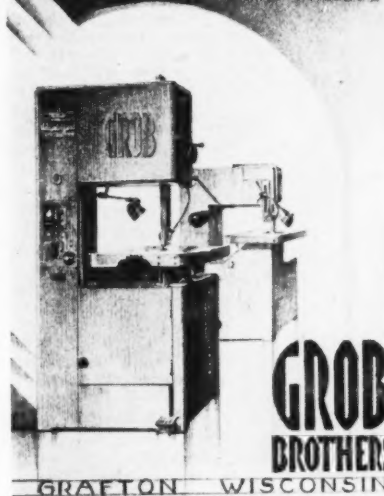
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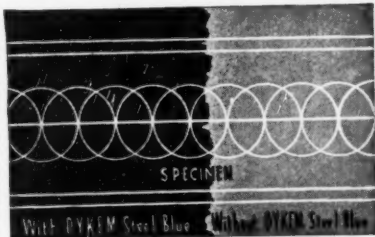
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more determination," Greenewalt said.

Bringing "the greatest good to the greatest number of people" requires the close cooperation of employees, of investors and of large and small businesses. "There is no difference between capital and labor—capital is labor, and labor is capital," the Du Pont president said.

"Most people who work, save, so that by and large the great industrial structure of the United States is owned by the people who work for it in a cooperative venture that brings great good to all of us.

"The idea that worker and stockholder sit on opposite sides of the street and try to pull in different directions is one of the great misconceptions of the day.

Mr. Greenewalt made an earnest appeal for more constructive understanding of industry as the basis for cooperation.

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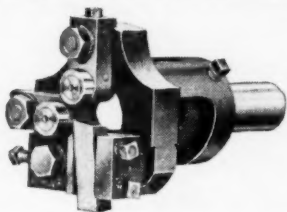
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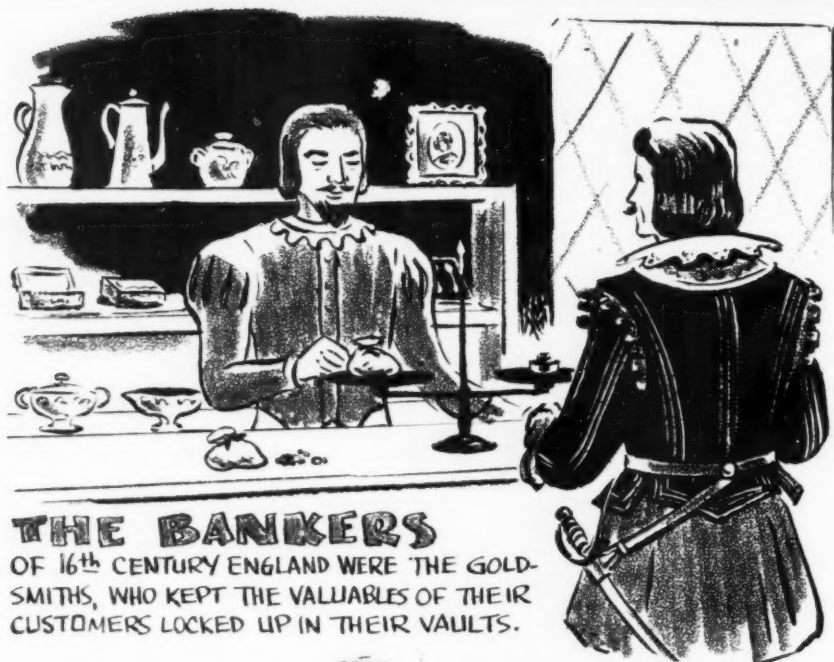
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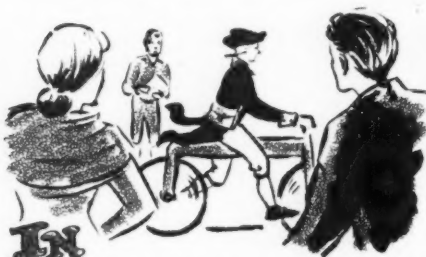
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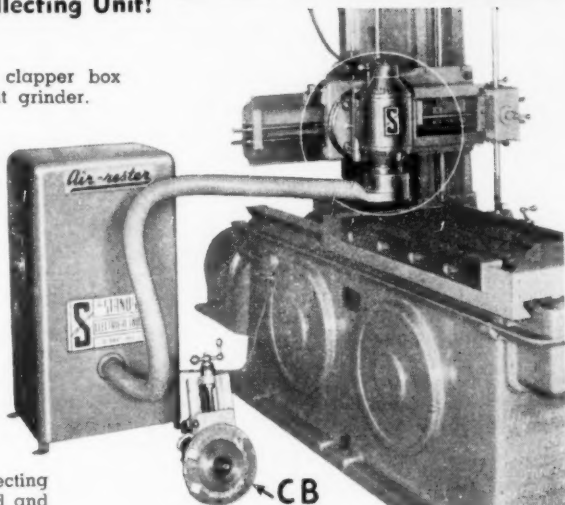
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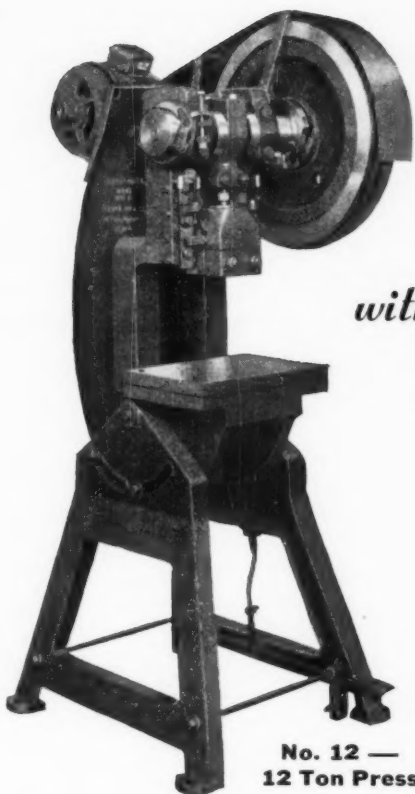
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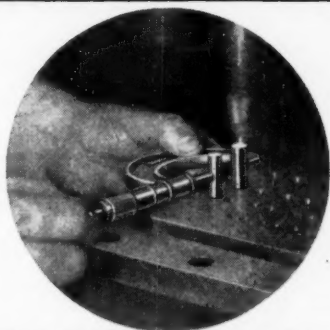
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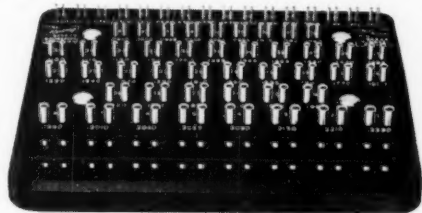
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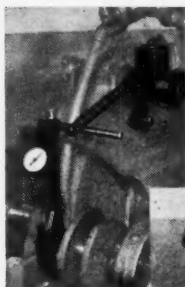
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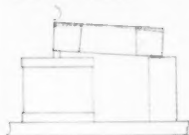
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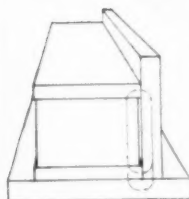
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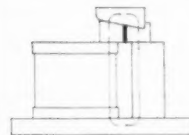
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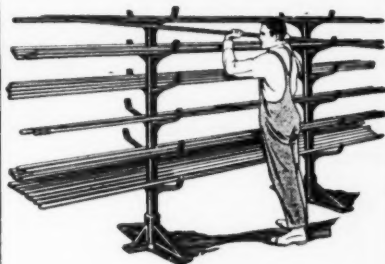
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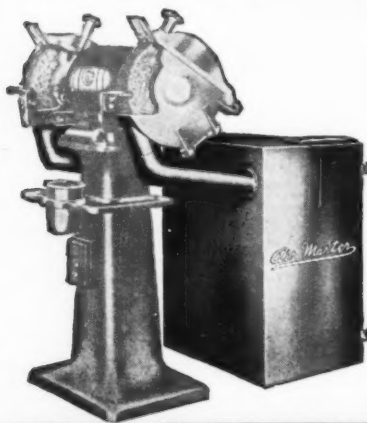
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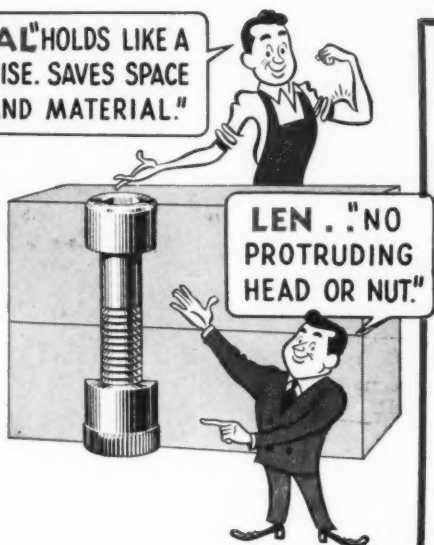
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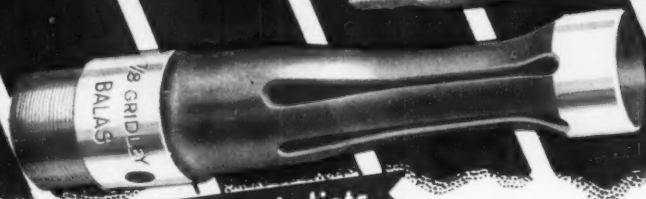
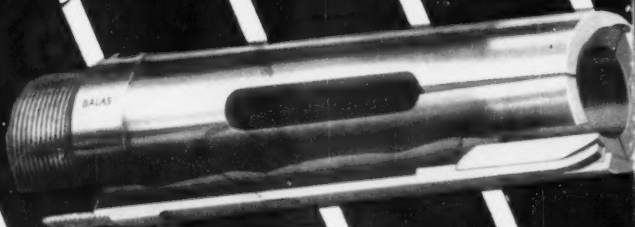
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